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A Companion to Descartes

Edited by
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A Companion to Descartes

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and

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For Kathleen Hitchner Setzer, and in memory of Gene Willis Setzer
J. S. B.

For Catherine Dowd Carriero and Nicholas Runfola Carriero
J. C.

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List of Abbreviations

- AT refers to the standard Franco-Latin edition of Descartes by C. Adam and P. Tannery, *Œuvres de Descartes*, 12 vols., revd. edn. Paris: J. Vrin/CNRS, 1964–76.
- CSM refers to the English translation by J. Cottingham, R. Stoothoff, and D. Murdoch, *The Philosophical Writings of Descartes*, vols. 1 and 2. Cambridge: Cambridge University Press, 1985.
- CSMK refers to the English translation by J. Cottingham, R. Stoothoff, D. Murdoch, and A. Kenny, *The Philosophical Writings of Descartes*, vol. 3: *The Correspondence*. Cambridge: Cambridge University Press, 1991.

Introduction

Philosophy can be a subject of tremendous immediacy, and no philosopher in the canon writes with more immediacy than Descartes. In an intuitive and natural way, he raises questions that occur to almost anyone in the course of life: What can I know with certainty? Am I alone in the world? Who or what made me? Is there a God? Am I the same thing as my body? If I am not, then how am I related to it? Ideally, students should encounter Descartes for the first time on their own; otherwise they will miss the intimacy and excitement of grappling directly with this great thinker's claims and arguments. There is such sheer exhilaration in a direct encounter with Descartes's ideas: his skeptical arguments that throw all of my knowledge into doubt; the *cogito* reasoning that rescues my knowledge of my own existence from the abyss of the doubt; the tantalizing (if baffling) arguments that I have been created by a supremely perfect God; and the argument that although I am "really distinct" from my body and could exist without it, I am all the same more intimately united with it than a sailor is to his ship. The sense of exhilaration is not something any reader should miss.

But often this experience leaves the first-time reader wanting to learn more: more about who Descartes was, who he was arguing with, what he thought about a whole range of issues, and what he meant by his sometimes mystifying ways of putting things. For example, a first-time reader of the First Meditation is bound to ask, "Who is this 'I' narrating his meditative thinking, and what are the sciences in which he wants to establish lasting results?" The question about "I" may lead on to questions about the Second Meditation, in which the self-knowledge of the "I" plays a pivotal role; and the question about the sciences may lead to questions about the way in which the role of the senses in knowing the world shrinks throughout the *Meditations*, while the role of the intellect expands. And of course these questions may lead to still others: Did Descartes think our certainty about our own existence established the distinction between the mind and the body? Did he think a physicist could make discoveries about the world just by sitting and thinking? And then there are the claims that mystify us, couched as they are in unfamiliar terms. What is objective reality? Eminent causation? A true and immutable nature?

As such questions arise, readers may want to invite a third party to join their encounter with Descartes: someone who has been around the block and can share his or her scholarly and philosophical experience. For example, it helps to have a better

picture of the full range of Descartes's works. After all, he was a prolific writer and a systematic thinker, and surely his pioneering work in mathematics had something to do with the way in which he approached questions in philosophy. And it is useful to understand more about the intellectual milieu in which Descartes worked: the sorts of philosophical ideas he grew up with, and which he may either be assuming or attacking (or both). For example, were his metaphysical ideas about causality and substance borrowed from his Aristotelian teachers, or did they represent a break with Scholastic philosophy? And to what extent did his advocacy of a mathematized physics drive the rest of his philosophy? Readers may also want help in focusing more intensely on specific philosophical claims and arguments that are prominent in Descartes's writings, either those that remain controversial and interesting to philosophers today – for example, skepticism about the external world, or mind-body dualism – or those that, while no longer live options today, were powerful in Descartes's own time, such as his corpuscular theory of the physical world.

Given all of these ways of illuminating Descartes's work, perhaps it is unsurprising that there is some controversy in scholarly circles concerning which approach to Descartes's thought we ought to take. For example, some would say that the study of the work of a great philosopher like Descartes is best carried out by scholars with specialized historical training; others are convinced that readers without such training can achieve valuable insight too. We ourselves believe that illumination of Descartes's philosophy can come from *many* perspectives, and that it would be foolish to disdain any of them. (Of course, that is different from saying that anything anyone writes about Descartes is illuminating, or that everyone will find the same perspectives intellectually exciting.)

What we have aimed to provide in this volume is a series of essays that will help readers of Descartes follow up on a host of questions. Besides having a wide range of topics, the volume also represents a wide range of perspectives on Descartes's philosophy, and we hope that this will be valuable to readers, too, by showing how many different ways there are to approach his work fruitfully. There is overlap among the essays, because the scholars and philosophers whose essays are published here cross one another's paths as they follow out different lines of thought in Descartes. Indeed, in some places readers will find the authors of these essays taking opposing positions on questions of interpretation; as readers who are familiar with philosophy will know, this is characteristic of philosophical discourse. Our aim in editing this volume has not been to produce a consistent and linear "story" about Descartes; rather, it has been to stimulate inquisitive readers of Descartes and to enable them to become more sophisticated students – historically, intellectually, and philosophically – of his thought.

Part I

The Intellectual Context

Chapter 1

Life and Works

STEPHEN GAUKROGER

In the seventeenth century, Descartes's reputation rested primarily first on his mathematics and then on his cosmology. In the eighteenth century, it shifted gradually from his cosmology to his mechanistic physiology, particularly his theory of "animal machines." In the wake of Kant's fundamental rewriting of the nature of philosophy, it was Cartesian metaphysics and epistemology that came to the fore in the nineteenth century. In Anglophone philosophy in the twentieth century, the revival of interest in empiricist epistemology, helped by the rise of positivism, resulted in skepticism being taken much more seriously as a philosophical problem, and Descartes's skeptically driven epistemology came to occupy the central ground. In French and German philosophy, by contrast, interest centered from the 1930s onwards on the ethical and political consequences of Descartes's idea of a self as independent of the world in which it finds itself, as a locus of subjectivity that is given prior to any interactions that it has with other subjects.

All these themes can be found in Descartes, as indeed can support for the eighteenth-century reading of Descartes as a dangerous materialist, as well as support for the twentieth-century reading of him as the paradigmatic dualist. These opposing positions are usually generated in the context of different projects, which have been homogenized – in the twentieth century this was achieved by taking the *Meditations* as a canonical text – in a way that hinders not only our understanding of Descartes, but also our understanding of the issues in their own right. Clarification is needed here, and considerable clarification can be achieved through a proper understanding of the development of Descartes's intellectual interests.

Early Life, 1596–1618

Descartes's mother died in childbirth just over a year after Descartes's own birth in 1596, and he had little contact with his father, who was a Councillor at the Parlement at Rennes, which required him to spend several months a year at Rennes: he moved there permanently in 1600, leaving Descartes at La Haye, where the family house was, with his grandmother. In 1606 Descartes was sent to the Jesuit College at La Flèche, one of the model colleges founded by the Jesuits at the end of the sixteenth century,

which were primarily designed to educate children of the gentry. These were boarding schools, and “total” institutions: holidays decreased from four weeks to one week a year as the child moved up the school, visits to parents outside the holidays were allowed only in dire cases, and life at the school was regulated in the finest details, with pupils subject to the exclusive authority of the masters. Yet the environment was designed to be a nurturing one, and a good deal of attention was devoted to motivating students. The aim was not to provide either an education for clerics or for the general populace. Rather, it was to make sure that those who were to take up positions of power in ecclesiastical, military, and civil life were inculcated not only with the requisite Christian values, but also with an articulate sense of the worth of those values and an ability to defend and apply them; and above all with an ability to act as paradigmatic Christian *gentilshommes*.

The first five years of the course at La Flèche were devoted to providing the student with a good knowledge of Latin, a basic knowledge of Greek, and a familiarity with a wide range of classical texts, with Cicero predominating. Most students left college after these initial five years, but some, including Descartes, stayed on. The final three years covered Aristotelian philosophy: dialectic – primarily the topics and syllogistic – then natural philosophy, including some elementary mathematics, and finally metaphysics and ethics. Theologically contentious issues were generally avoided, and the commentaries and compendia from which Descartes learned his philosophy had as their aim the reconstruction of a Christianized Aristotelianism from first principles. These textbooks were broadly Thomist in orientation, but the student was not exposed directly to Aquinas, so it is not surprising that Descartes shows no familiarity with the writings of Aquinas until around 1628. More surprising is his lack of familiarity with developments in the scholastic textbook tradition: in 1640 he wrote to Mersenne asking him for the names of scholastic textbooks, mentioning that he remembered the names of one or two authors from school but that he hadn’t looked at anything in this genre for 20 years and was completely out of touch with it (AT 3:185). Descartes’s philosophical interests evidently developed quite independently of his scholastic training.

On graduating from La Flèche, he spent some time in Paris before attending the University of Poitiers studying law, and perhaps some medicine, completing his law examinations at the end of 1616. He considered a career in law, but instead finally decided to join the army of Maurice of Nassau. Maurice’s army was of a new kind and Descartes studied fortification, military architecture, and various other practical engineering skills. It is around this time that we find Descartes’s life taking a distinctive intellectual trajectory.

Apprenticeship with Beeckman, 1618–1619

At the end of 1618, Descartes met Isaac Beeckman, eight years his senior. Beeckman had been working on natural philosophical and practical mathematics from 1613, when he had set out a novel theory of the behavior of unconstrained bodies (which later became a theory of inertia). “Physico-mathematicians are very rare,” he wrote in a diary entry for December 1618, shortly after meeting Descartes for the first time, and he notes that Descartes “says he has never met anyone other than me who pursues his

studies in the way I do, combining physics and mathematics in an exact way. And for my part, I have never spoken with anyone apart from him who studies in this way.” It was Beeckman who introduced Descartes to a quantitative micro-corpuscularian natural philosophy, one that he was to reshape and make into his own very distinctive system of natural philosophy.

Descartes’s earliest writings, which derive from late 1618 and early 1619, deal with questions in practical mathematical disciplines. He composed a short treatise on the mathematical basis of consonance in music, exchanged letters with Beeckman on the problem of free fall, and worked with him on a number of problems in hydrostatics. The second, and particularly the third, of these exercises are of interest. In the correspondence on free fall (AT 10:58–61, 75–8, 219–22), Beeckman poses Descartes a mathematical question about the relation between spaces traversed and times elapsed in free fall, but Descartes seems keen to steer the question in the direction of dynamics, seeking the nature of the force responsible for the continued increase in motion. The move is not successful, and in fact it leads Descartes to misconstrue the original problem, but it is indicative of what will be an important and productive feature of his thinking about mechanical problems, and later about physical problems more generally.

The hydrostatics manuscripts (AT 10:67–74) are of even greater interest in this respect. Here Descartes turns his attention to a paradoxical result that Simon Stevin had proved in hydrostatics, namely that the pressure exerted by a fluid on the base of its container is independent of the amount of fluid and, depending on the shape of the vessel, can be disproportionate to the weight of the fluid. Here, Descartes takes a question which has been solved in rigorous mathematical terms and looks for the underlying physical causes of the phenomenon. He construes fluids as being made up from microscopic corpuscles whose physical behavior causes the phenomenon in question, and he asks what kinds of behavior in these corpuscles could produce the requisite effect. This is in effect an attempt to translate what Stevin had treated as a macroscopic geometrical question into a dynamically formulated micro-corpuscularian account of the behavior of fluids. In the course of this, Descartes develops a number of rudimentary dynamical concepts, particularly his notion of *actio*, which he will use to think through questions in physical optics in the mid-1620s, and then questions in cosmology in 1629. This is of particular importance because his whole approach to cosmological problems, for example, is in terms of how fluids behave, because it is fluids that carry celestial bodies around in their orbits.

By the end of 1619 Descartes’s principal interest had shifted to mathematics, and this interest was stimulated by reflection upon an instrument called a proportional compass, which had limbs that were attached by sliding braces so that, when the compass was opened up, the distances between the limbs were always in the same proportion. The proportional compass enabled one to perform geometrical operations, such as trisection of angles, and arithmetical ones, such as calculation of compound interest, and Descartes asked how it was possible for the same instrument to generate results in two such different disciplines as arithmetic, which deals with discontinuous quantities (numbers), and geometry, which deals with continuous quantities (lines). Since the principle behind the proportional compass was continued proportions, he realized that there was a more fundamental discipline, which he initially identified with a theory of proportions, later with algebra. This more fundamental discipline had two

features. First, it underlay arithmetic and geometry, in the sense that, along with various branches of practical mathematics such as astronomy and the theory of harmony, these were simply particular species of it, and for this reason he termed it *mathesis universalis*, “universal mathematics.” Its second feature was that this universal mathematics was a problem-solving discipline: indeed, an exceptionally powerful problem-solving discipline whose resources went far beyond those of traditional geometry and arithmetic. Descartes was able to show this in a spectacular way in geometry, taking on problems, such as the Pappus locus-problem, which had baffled geometers since late antiquity, and he was able to show how his new problem-solving algebraic techniques could cut through these effortlessly. In investigating the problem-solving capacity of his universal mathematics, however, Descartes suspected that there might be an even more fundamental discipline of which universal mathematics itself was simply a species, a master problem-solving discipline which underlay every area of inquiry, physical and mathematical. This most fundamental discipline Descartes termed “universal method,” and it is such a method that the *Regulae* sought to set out and explore.

The *Regulae*, 1619–1628

When Descartes began work on the *Regulae*, it was intended to be in three parts, each part to contain twelve “Rules.” What was offered was a general treatise on method, covering the nature of simple propositions and how they can be known (first twelve Rules), and how to deal with “perfectly understood problems” (second set of Rules) and “imperfectly understood problems” (projected third set). The composition proceeded in two stages, however, and the nature of the work shifted somewhat between stages. In 1619–20 Descartes completed the first eleven Rules, and then apparently abandoned the project. When he took up the *Regulae* again in 1626–8, he revised two of these (Rules 4 and 8) and added Rules 12 to 18, with titles only for Rules 19–21. The thrust of the work remains methodological, and mathematics is still taken very much as the model – which is what we would expect, since the fact that the move to universal method comes through universal mathematics is what provides the former with its plausibility. But the completed Rules of the second part, particularly Rules 12–14, focus on the question of how a mathematical understanding of the world is possible by investigating just what happens in quantitative perceptual cognition, that is, just what happens when we grasp the world in geometrical terms.

Descartes’s thinking on perceptual cognition was doubtless stimulated by his work in optics. He settled in Paris in 1625, and began working on optics partly in collaboration with Claude Mydorge. Some time between 1626 and 1628, he discovered the sine law of refraction, and on the basis of this he was able to establish what curvature the surface of a lens needed if it was to refract parallel rays striking its surface to a single point. Spherical surfaces were unable to do this, and as a result the spherical sections used as lens did not form a single clear image, which was an immense drawback, especially in telescope lenses. At this time he also attempted to develop a physical theory of light which would explain why light behaved in particular geometrically circumscribed ways when reflected and refracted. His work on the way in which the visual system in

animals worked resulted in a naturalized account of perceptual cognition (Rules 12–14 of the *Regulae*, later developed in more detail in *L'Homme*) in which he began to think through questions of our perceptual representation of the world. One general question that guided his work on representation was whether there was a way of representing information in such a way that its truth or falsity would be immediately manifest. Descartes believed he had found such a means of representation in the case of mathematics, and the aim was to generalize this in the form of a “universal method.”

Specifically, the problem that Descartes faced was that universal method was supposed to provide a general form of legitimation of knowledge, including mathematical knowledge, but algebra also provided its own specific kind of legitimation of mathematical knowledge. The point at which the *Regulae* break off and are abandoned is exactly that at which it becomes clear that these two forms of legitimation come into conflict. The general form of legitimation provided by universal method is one in which problems are represented in the form of clear and distinct ideas, and Rule 14 spells out just what this means in the case of mathematics: it means representing the pure abstract entities that algebra deals with in terms of operations on line lengths, and in this way the truth or falsity of the proposition so represented is evident. To take a simple example, the truth of the proposition $2 + 2 = 4$ is not immediately evident in this form of representation, but it is evident if we represent the operation of addition as the joining together of one pair of points, $\cdot$, with another, $\cdot$, and we see that the sum is $::$ (Descartes uses line lengths but the principle is the same). In this case we can see how the quantities combine to form their sum (and this is just as evident in the case of very large numbers the numerical value of whose sum we cannot immediately compute). This is a very insightful and profound move on Descartes's part. The problem he is concerned with is that of identifying those forms of mathematical demonstration in which we can grasp not merely that the solution or conclusion follows from the premises, but in which we can track how the solution or conclusion is generated. The difficulty that arose was that the range of operations for which this kind of basic legitimatory procedure held did not extend to the more sophisticated kinds of operation with which Descartes's algebra was able to work. And it is just such operations that begin to be envisaged in Rules 19–21, namely the extraction of higher-order roots, where no manipulation of line lengths is going to generate the result.

It is at this point that the *Regulae* are abandoned, and this also marks the end of the attempt to model knowledge on mathematics, at least in anything other than a merely rhetorical sense. When mathematics is invoked from now on, it will be invoked as a paradigm of certainty, but, in contrast to the work of the 1620s, it will cease to be accompanied by an attempt to capture at any level of mathematical detail just what this certainty derives from or consists in. Indeed, Descartes's interest in methodological questions in his later writings comes to be overdetermined by metaphysical, epistemological, and natural philosophical issues.

Le Monde and L'Homme, 1629–1633

In 1630 Descartes moved to the Netherlands, which was to be his home for the next twenty years, and from the end of 1629 he began work on a new project, which was

originally intended to be in three parts. The first part (*Le Monde*) would cover inanimate nature, the second (*L'Homme*) would cover animal and human non-conscious functions, and these were to have been complemented by a third part, on the "rational soul," which never appeared.

Le Monde sets out a theory of the physical world as something consisting exclusively of a homogeneous matter, which can be considered as comprising three types of corpuscle, distinguished solely by size. On the basis of laws describing the motion of these corpuscles, a mechanistic cosmology is set out which includes both a celestial physics and an account of the nature and properties of light. Descartes begins with an argument to the effect that the world may be different from our perceptual image of it, and indeed that our perceptual image may not even be a reliable guide to how the world is. This is in no sense a skeptical argument, and once Descartes has established the nature of the world, it is clear that we can know it to be very different from our perceptual image of it.

Matter theory is developed in a systematic way in *Le Monde*. The general principle from which Descartes works is that, given that all bodies can be divided into very small parts, a force is required to separate these parts if they are stationary with respect to one another, for they will not move apart of their own accord. If the very small parts of which the body is constituted are all at rest with respect to one another, then it will require significant force to separate them, but if they are moving with respect to one another, then they will separate from one another at a rate which may even be greater than that which one could achieve by applying a force oneself. The former bodies are what we call solids, the latter what we call fluids, and in the extreme cases they form the ends of a spectrum on which all bodies can be ranked, with rigid solids at one terminus and extremely fluid bodies at the other. This ranking on a spectrum of fluidity provides the basis for Descartes's theory of matter, for it enables him to reduce the properties of matter to the rate at which its parts move with respect to one another.

All bodies, whether fluid or solid, are made from the one kind of matter on this account. Descartes famously argues that there are no interstitial vacua in matter: the universe is a plenum. Moreover, he argues that even if one assumed there were vacua, the degree of fluidity of a body would not be proportional to the amount of vacuum that exists between its constituent parts because the parts of a liquid would be more readily compressed into a continuous whole than would be the parts of a solid. On his account of matter, if we strip the world of the traditional forms and qualities, what we would be left with would be its genuine properties. This new world is to be conceived as "a real, perfectly solid body which uniformly fills the entire length, breadth, and depth of the great space at the center of which we have halted our thought" (AT 11:33). This perfectly solid body is "solid" in the sense of being full and voidless, and it is divided into parts distinguished simply by their different motions. At the first instant of creation, God provides the parts with different motions, and after that he does not intervene supernaturally to regulate their motions. Rather, these motions are regulated by three laws of nature, set out in chapter 7 of *Le Monde*: first, a body will always continue in its state of motion unless stopped or retarded by another body; second, in collisions between such bodies the total amount of motion is conserved; third, whatever the path of a moving body, its tendency to motion is always rectilinear.

Using the theory of matter and laws of nature which have now been elaborated, Descartes now sets out the details of a heliocentric cosmology in the form of an account of a hypothetical “new world.” The key to this whole cosmology is Descartes’s account of vortices. Because the universe is a plenum, for any part of it to move it is necessary that other parts of it move, and the simplest form of motion which takes the form of displacement is going to be a closed curve, although we have no reason to think that the universe turns around a single center: rather, we may imagine different centers of motion. The matter revolving furthest away will be the largest or most agitated because it will describe the greatest circles, owing to its greater capacity to realize its inclination to continue motion in a straight line, for the larger the circle, the closer it approximates a straight line. Whatever differences in size and agitation we may imagine there to have been in the early stages of the universe, however, except for the large clumps of the third element (see below), we can imagine that the constant motion and collision caused the difference in sizes of matter to be reduced as “the larger pieces had to break and divide in order to pass through the same places as those that preceded them.” Similarly, differences in shape gradually disappear as repeated collisions smooth off the edges and all matter (of the second element) becomes rounded. Some pieces of matter are sufficiently large to avoid being broken down and rounded off in this way: these are what Descartes refers to as the third element, and such pieces of matter form the planets and the comets. Finally, the collisions yield very small parts of matter, which accommodate themselves to the space available so that a void is not formed, but this first element is formed in a greater quantity than is needed simply to fill in the spaces between pieces of the second and third element, and the excess naturally moves towards the center because the second element has a greater centrifugal tendency to move to the periphery, leaving the center the only place for the first element to settle. There it forms perfectly fluid bodies which rotate at a greater rate than surrounding bodies and which extrude fine matter from their surfaces. These concentrations of the first element in the form of fluid, round bodies at the center of each system are suns, and the pushing action at their surfaces is “what we shall take to be light.”

The universe, as Descartes represents it, consists then of an indefinite number of contiguous vortices, each with a sun or star at the center, and planets revolving around this center carried along by the second element. Occasionally, however, planets may be moving so quickly as to be carried outside the solar system altogether: then they become comets. Descartes describes the difference between the paths of planets and comets in terms of an engaging analogy with bodies being carried along by rivers: the latter are like bodies that will have enough mass and speed to be carried from one river to another, whereas the former are like bodies that are just carried along by the flow of their own river. Planets eventually enter into stable orbits – the less massive they are, the closer to the center – and once in their orbits they are simply carried along by the celestial fluid in which they are embedded. The stability of their orbits arises because, once a planet has attained a stable orbit, if it were to move inward it would immediately meet smaller and faster corpuscles of the second element which would push it outward, and if it were to move outward, it would immediately meet larger corpuscles which would slow it down and make it move inward again.

Descartes’s achievement in *Le Monde* is twofold. In the first place, his vortex theory explains the stability of planetary orbits in a way that presents an intuitively plausible

picture of orbital motion which requires no mysterious forces acting at a distance: the rapid rotation of the sun at the center of our solar system, through its resultant centrifugal force, causes the “pool” of second matter to swirl around it, holding planets in orbits as a whirlpool holds bodies in a circular motion around it. Moreover, it explains this motion in terms of fundamental quantifiable physical notions, namely centrifugal force and the rectilinear tendencies of moving matter. In other words, the heliocentric theory is derived from a very simple theory of matter, three laws of motion, and the notion of a centrifugal force. Secondly, this account also enables Descartes to account for all the known principal properties of light, thereby providing a physical basis for the geometrical optics that he had pursued so fruitfully in the 1620s.

The second part of the project, *L'Homme*, is part of the same enterprise in natural philosophy, extending the mechanist program into physiology, and relying on the matter theory and mechanics established in *Le Monde*. In some ways, *L'Homme* was even more radical than *Le Monde*. The idea that mechanism might allow one to account for everything from physical processes to the behavior of celestial bodies was certainly contentious, not least in the Copernican consequences that Descartes draws from this. But the project was common ground among quite a few natural philosophers in the 1630s: Beeckman, Mersenne, and Gassendi, for example. A mechanistic physiology was a different matter: this was both far more ambitious and far more threatening. In *Le Monde*, Descartes postulated a single kind of matter in the universe and this matter is inert, homogeneous, and qualitatively undifferentiated. The boundaries of bodies are determined by motion relative to surrounding matter and any variation in properties is a function of the size, speed, and direction of the matter. It is with this notion of matter that Descartes attempts to account for all functions and behavior of animals.

Animal physiology is introduced right from the beginning of *L'Homme* as the workings of a machine. The digestion of food is described in a mixture of mechanical and chemical terms. The food is first broken down into small parts and then, through the action of heat from the blood and that of various humours which squeeze between the particles of blood, the food is gradually divided into excrementary and nutritive parts. The heat generated by the heart and carried in the blood is the key ingredient here, and Descartes devotes much more attention to the heart and the circulation of the blood than to functions such as digestion and respiration. He accepts that blood circulates throughout the body, but like most of his contemporaries rejects Harvey's explanation of circulation in terms of the heart being a pump, preferring to construe the motion as being due to the production of heat in the heart. The heart is like a furnace, or rather like the sun, for it contains in its pores “one of those fires without light,” which are comprised of the first element that also makes up the sun. In fact, Descartes really had little option but to reject Harvey's account. To accept that the motion of the blood was due to the contractive and expansive action of the heart would have required providing some source of power for its pumping action, and it was hard to conceive how he could do this without recourse to non-mechanical powers, whereas at least he can point to phenomena such as natural fermentation in defending his own account of thermogenetic processes creating pressure in the arteries. The most important features of the circulation of the blood from the point of view of Cartesian psychophysiology is the fact that it carries the “animal spirits,” which it bears up through the carotid arteries into the brain. These are separated out from the blood and enter the brain through the

pineal gland, at the center of the cerebral cavities. This is a mechanical procedure in that the animal spirits are the subtlest parts of the blood and hence can be filtered into the pineal gland through pores too fine to admit anything larger (AT 11:128).

Having dealt with the heart – the heat of which is the “principle of life” – and the circulation of the blood, Descartes now turns (AT 11:130) to the nervous system. The nervous system works by means of the animal spirits, which enter the nerves and change the shape of the muscles, which in turn results in the movement of the limbs, an analogy being drawn with the force of water in fountains. In general terms, what happens is that external stimuli displace the peripheral ends of the nerve fibers, and a structural isomorph of the impression made on the sense organ is transmitted to the brain. This results in changes in the patterns formed by the animal spirits in the brain, which can produce changes in the outflow of spirits to the nerves. At the muscle, a small influx of spirit from the nerve causes the spirits already there to open a valve into its antagonist. Spirits then flow from the antagonist which causes it to relax, as well as causing the first muscle to contract.

The two greatest challenges for Descartes’s mechanized physiology lie in two areas which had traditionally been treated as unproblematically goal-directed: the formation of the fetus, and perceptual cognition. In the case of fetal development, Descartes’s aim, in *L’Homme* and in the later physiological text *Description du corps humain*, is to show that a perfectly good account of this can be given which makes no reference to intrinsic goals at all.

Most biological processes can be thought of in goal-directed terms: nutrition, respiration, excretion, sleep, etc. But then many non-biological physical processes can also be thought of in goal-directed terms, and Aristotle had argued that the explanation of the fall of heavy bodies to the ground had to display the goal-directedness of this process. This raises the problem of where we draw the line. We may concede that a process can be described in terms of a goal without conceding that goal-directedness plays any genuine part in explaining the process. Unless we think that teleology must play a part in every natural organic process, for example, we will not be inclined to think that growth in adolescents or adults requires explanation in terms of ends or goals. On the other hand, we may be inclined to think that the development of the fetus does require an explanation in terms of ends or goals: it develops in this way because it is developing into a horse, or a person, or a bird. In the middle of these two is a gray area. We can think of Descartes’s strategy as pushing fetal development into the gray area, in which case the question of the right kind of explanation will no longer be judged by *a priori* considerations about whether goals are relevant, but by how effective whatever concrete explanation one comes up with is in accounting for the detail. More schematically, although Descartes does not lay out his plan for dealing with this question explicitly, it seems clear that a threefold strategy must lie behind any thoroughgoing mechanist approach to embryology. First, ordinary growth is accounted for in a way that makes no references to goals. Secondly, the process of formation and maturation of the fetus is treated simply as a species of growth: it involves a significantly greater increase in complexity and internal differentiation of parts than the process of growth from childhood to adulthood, of course, but this in itself does not make it qualitatively different. Third, the mechanist must show how the development from a low degree of complexity and internal differentiation to a high degree of complexity and differentiation is

something that can be handled in mechanistic terms. What this strategy allows one to do is to provide a general account of growth, in terms of how raw material is introduced into the organism from outside and transformed into the kinds of highly differentiated material making up bones, blood, muscle, etc. Then, having done this, one shows how the kind of account developed in this way can be extended to the case where the organs are not simply being increased in size but are actually being formed anew.

Descartes allows a form of genuine perceptual cognition in animals, whom he considers to be strictly mindless, and his highly naturalistic account of cognition in “automata” also applies to many features of human cognition. But unlike fetuses, human beings harbor intrinsic goals, above all the goal of understanding the world, and human cognition can be criticized to the extent to which it fails to achieve that goal.

Skeptically Driven Epistemology, 1633–1641

Le Monde and *L'Homme* were suppressed by Descartes on hearing of the condemnation of Galileo, and they did not appear in his lifetime. Galileo's *Dialogue Concerning the Two Chief World Systems* was condemned by the Roman Inquisition on July 23, 1633, and the condemnation had clear implications for *Le Monde*. Galileo's *Dialogue* provided physical evidence both for the Earth's diurnal rotation, in the tides, and for its annual orbital motion, in cyclical change in sunspot paths. The Inquisition's condemnation focused on the question of the physical reality of the Copernican hypothesis. A core issue was “a matter of faith and morals” which the second decree of the Council of Trent had given the Church the sole power to decide. Opponents of Galileo treated scripture as a source of scientific knowledge, and argued that the case was covered by the criterion that stated that the Church Fathers, if they agreed on something, cannot err on dogmas of the faith. In the 1633 condemnation this interpretation was effectively established, and this meant that the physical motion of the Earth could not be established by natural philosophical means. Thus not only did the kind of argument that Galileo had offered in the *Dialogue* have no power to decide the issue, but neither did the kind of arguments that Descartes had offered in *Le Monde*.

Descartes's reaction to this was twofold. In the first place, he collected some of his scientific work that was untouched by the 1633 condemnation and published this as three essays, on optics, meteorology, and geometry. The cosmological setting for Descartes's theory of light is ignored in the *Dioptrique*, where the concern is with geometrical optics, rather than physical optics, and the contentious cosmological consequences of his physical optics are avoided. Most of the material in the essay on meteorology is very traditional, but one section, that on the rainbow, is novel, and indeed Descartes identifies it as the example of his “method.” It is of interest in countering those views of Descartes that construe him as deducing his results in natural philosophy from first principles, for the procedure adopted there offers an experimental means of sifting empirical hypotheses, and offers a model of how to quantify optical phenomena.

The second kind of reaction, offered in the *Discourse* and the *Meditations*, was more radical. The ultimate outcome of the crisis provoked by the condemnation of Galileo's

heliocentrism was a new direction in Descartes's work. He does not abandon interest in natural philosophy, and to the end of his life continues to think it has been his most important contribution. In a letter to Princess Elizabeth of Bohemia of June 28, 1643, he tells her that the principles of metaphysics must be understood, but once understood one need spend no more time upon them. Rather, one should then proceed to devoting one's time "to thoughts in which the intellect co-operates with the imagination and the senses" (AT 3:695), that is, natural philosophy. The same point is made to Burman in 1649, Descartes insisting that one should not waste too much time on metaphysical questions, especially his *Meditations*, as these are just preparation for the main questions, which "concern physical and observable things" (AT 5:165).

But Descartes's interest in natural philosophical areas such as optics, mechanics, and cosmology after 1633 is confined largely, if not exclusively, to polemics and systematization, and above all to the legitimation of a mechanist natural philosophy by metaphysical and epistemological means, a completely different enterprise from that pursued in the pre-1633 works, of which *Le Monde* and *L'Homme* are the culmination. Setting out the kind of metaphysics that gives just the right fit with his natural philosophy, indeed grounds the kind of natural philosophy he wants, is the preoccupation of the *Meditations* and the first Part of the *Principia*, which reworks the *Meditations*.

The *Meditations* use a skeptically driven epistemology to systematically strip down the world – the world of common sense and the world of Aristotelian natural philosophy – so that the assumptions that lie behind this picture are laid bare, and found wanting. Descartes then proceeds to build up the world metaphysically from first principles, using a notion of clear and distinct ideas, backed up by a divine guarantee. What this yields is a sharp distinction between the mind and the corporeal realm, and an account of the corporeal realm radically different from that with which the *Meditations* began. Because our new starting point is clear and distinct ideas (the paradigm for which is the *cogito*), we cannot ask about the existence of the corporeal world without having a clear and distinct idea of what it is that we are asking for the existence of. The question of existence only becomes determinate, and thereby answerable on Descartes's account, when we ask whether something with particular characteristics exists, where the characteristics in question are not only fully specified but securely grasped. Unless we start from things that we clearly and distinctly grasp we can never be sure we are actually getting anywhere. The question is whether there are any conceptions of the corporeal world available to us which offer a grasp of this kind. Descartes's answer is that he knows of only one, namely a mathematical grasp of the world. Corporeal things, he tells us at the end of the *Meditations*, "may not all exist in a way that exactly corresponds with my sensory grasp of them, since sensory understanding is often very obscure and confused. But at least they possess all things that I perceive in them clearly and distinctly, that is to say, all those things which, generally speaking, come under the purview of pure mathematics" (AT 8A:80).

If the arguments of the *Meditations* go through, what Descartes has established is that our starting point in natural philosophy must be a world stripped of all Aristotelian forms and qualities, and consisting in nothing but geometrically quantifiable extension. The only natural philosophy compatible with such a picture is mechanism, in particular, mechanism of the kind set out by Descartes in the matter theory and mechanics of *Le Monde*. If we grant him his matter theory, and two of the basic principles of his

mechanics, the principle of rectilinear inertia and that of centrifugal force, then, if the argument of *Le Monde* is correct, we have heliocentrism, for this is all he needs. In this way, the *Meditations* connect up directly with *Le Monde*, providing a metaphysical route to the natural philosophy of the latter and providing a legitimation of the whole enterprise.

A System of Philosophy, 1641–1644

The year in which Descartes prepared the *Meditations* for publication marked the beginning of an acrimonious five-year period in which Descartes was publicly attacked by the Dutch theologian Gisbert Voetius. Descartes's follower Regius had alienated a number of his colleagues with his polemics on behalf of Cartesianism, and Voetius, failing to have Regius removed from his chair of medicine at Utrecht, directed his attacks at Descartes. At this time, Descartes was preparing to connect his natural philosophy to his new legitimacy foundations, in the *Principia*, the first four books of a projected six appearing in 1644.

The *Principia* begins with what is, despite a reordering of some arguments, in effect a summary of the *Meditations*, but it does not simply lead into *Le Monde*. Much the same ground is covered, but the material is reworked in terms of a metaphysical vocabulary of substance, attributes, and modes wholly absent from *Le Monde*, and not required for its natural philosophical focus (as opposed to the legitimacy thrust of the *Principia*). This metaphysical rewriting of Cartesian natural philosophy provides it with a wholly new focus, as questions of the legitimacy of this way of proceeding in natural philosophy overshadow those of how specifically natural philosophical processes are to be understood. Nevertheless, the metaphysical apparatus set out in the first part of the *Principia* is not an optional extra. What Descartes wants to show is that his system of natural philosophy is the only one that meets a set of stringent foundational requirements, requirements which must be satisfied if one is even to begin setting out a natural philosophical system. These requirements turn on the question of clarity and distinctness. The key move in Descartes's foundational strategy is the use of skeptical doubt to force open the question of what our starting point in any cognitive enterprise should be, and to establish clear and distinct ideas as the only possible starting point. This is reinforced by his insistence that we cannot even ask about the existence of something unless we have a clear and distinct grasp of what it is that we are asking about: only if the world is conceived in a particular way can we begin to inquire into its existence and ask what properties it has.

This way of proceeding depends on an understanding of metaphysics as something guided by epistemological concerns (in the form of the doctrine of clear and distinct ideas), and on an understanding of epistemology as being driven in turn by natural philosophical considerations. On the first question, it is worth noting, for example, that when Descartes's account of substance in Book I of the *Principia* turns out to yield two incompatible definitions (arts 51 and 52), he resolves this by ignoring metaphysical considerations and settling the question via the doctrine of clear and distinct ideas (arts 54 and 60), so that it is now the fact that our clear and distinct conceptions of God, mind, and matter are completely different from each other that secures their

status as independent kinds, and no longer considerations of substance. On the question of the role of natural philosophy, one needs only to compare Books II to IV of the *Principia* with *Le Monde* to realize that the role of the epistemologized metaphysics of Book I is that of providing a legitimating foundation for a system of natural philosophy which has already been developed without the benefit of these legitimating foundations.

Yet Descartes is adamant that what marks out his system from others is that it is the only ultimately legitimate one, and when in 1646 his erstwhile follower Regius published his own version of Cartesian natural philosophy, which dispensed with any of Descartes's legitimacy apparatus, Descartes immediately distanced himself from it and attacked Regius, in 1648 publishing his *Notae in programma*, a point-by-point response to Regius, in which the errors to which one is subject when one has not thought through the questions in basic foundational terms are exposed.

The Passions of the Soul, 1643–1650

In 1643 Descartes began an affectionate and fruitful correspondence with Princess Elizabeth of Bohemia, who was at that time 24. He did not see her very frequently between 1643 and 1646, when she departed from the Netherlands, but he clearly had a strong personal attachment to her right up to his death. Elizabeth pressed Descartes on a number of questions about the passions, raising issues of the mind-body relationship and ethics. In the context of affective states, he returns to the largely naturalistic account that guided his account of cognitive states in *L'Homme*. In this correspondence he distinguishes “three kinds of primitive notions,” namely the mind, the body, and the union of the two (AT 3:691), and it is the union of the two – that is, for all intents and purposes, embodied mind – that does all the work as far as mind is concerned, for disembodied mind plays no role in perceptual cognition, and it is far from clear what role it plays in the more problematic case of intellectual cognition. Nevertheless, it is crucial for Descartes's program that the sharp distinction between mind and body not be blurred (he rejects the almost universally held conception of higher and lower faculties on these grounds). This is, I believe, primarily because his ethics requires him to conceive of the human mind as distinctive, in that we can stand back from our cognitive and affective states and make judgments about them, and for this human being must have a unified locus of subjectivity, over and above the modularized corporeal faculties we share with animals.

In 1649 Descartes left the Netherlands for the court of Queen Christina of Sweden. The move does not seem to have been a success. The dominant intellectual influence at the court was the Dutch humanist Isaac Vossius, and his understanding of an intellectual culture was very different from that of Descartes, effectively marginalizing Descartes, despite his greater reputation. The winter of 1649/50 was the coldest one for sixty years, and Descartes caught pneumonia. Refusing the attentions of Christina's personal physician, Johan van Wullen, who had sided with the Dutch theologian Regius in a vicious attack on Descartes's work, he followed his own cure of wine flavored with tobacco. This was not a success and he died on February 11, 1650. His remains were returned to France in 1666, exhumed several times, and his skull, which

was removed from the rest of the remains in 1666, now rests in the *Musée de l'homme* in Paris.

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Chapter 2

Aristotelian Natural Philosophy: Body, Cause, Nature

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It is difficult now to imagine an intellectual landscape so thoroughly dominated by one figure as was that of the Schools by Aristotle. Except on certain well-known questions, the presumption was that Aristotle, suitably interpreted, was right. Nevertheless Aristotelianism was no frozen monolith (Schmitt and Skinner 1988). During the four centuries of its predominance, it continued to change, and admitted on all but fundamental points or those on which ecclesiastical authorities had pronounced, a great latitude – within, as in all such frameworks, the limits of *its* thinkable.

In what follows I present some basic features of Aristotelian natural philosophy around 1600. I do so with Descartes in mind, and from his perspective. I therefore emphasize the views of Jesuit authors. In the first section of this chapter, I outline the institutional setting and discursive forms in which Aristotelian natural philosophy was presented, examining in particular the role of authority and experience. The rest of the chapter takes up three topics: substance, especially corporeal substance or body; natural change and the efficient and final causes; art and nature. The aim is to provide a sense of the philosophical framework within which Descartes was educated and to which he continued to respond. Knowing that framework helps to forestall misunderstandings; it gives us a Descartes who, interpreted not from the future but from his past, will not be a mere spokesman for some present-day position.

Institutions, Forms, Authorities

In the first book of the *Principles*, Descartes describes the *præjudicia* or preconceived opinions we acquire early in life when the mind is in thrall to the body. Those opinions turn out quite often to coincide with the opinions of the Schools. That Descartes thinks of Aristotelianism as foisted upon a mind still in tutelage is no surprise. It was, in the intellectual setting of the early seventeenth century, above all something *taught*. From the 1250s on, Aristotle's works were the basis of the baccalaureate curriculum. In three years, students would hear lectures on logic, metaphysics, natural philosophy, and ethics, lectures which took the form of commentary on Aristotle's text, divided into small portions called *lectiones* or *textus*. Paraphrases and philological elucidations were accompanied by *quaestiones* or "questions" suggested by the text. To each of the works

that figured regularly in teaching there was attached a series of standard *quaestiones* in disputational form (Marenbon 1987).

In the second half of the seventeenth century, the format of commentary and questions began to give way to that of the *cursus* or textbook (Stone 2005), in which the subject matter was treated not in the order imposed on commentary by the text, but systematically, as in Suárez's *Disputationes metaphysicae* (1597) or the *Cursus philosophicus* of Roderigo Arriaga (1632). The textbook made possible a pedagogically convenient arrangement of the material; because it was no longer bound to the text, new topics could be more easily introduced. The *Cursus* (1632–5) of John of St. Thomas, for example, includes a question on the “new star” observed by Tycho Brahe. The *Physica* (1669–71) of Honoré Fabri, a Jesuit who corresponded with Mersenne and Leibniz, departs even more from tradition, engaging in controversy with Descartes and other new philosophers.

That commentary should have been central to the teaching of natural philosophy for so long reflected the economy of knowledge in the medieval period. In matters of faith, God was the highest authority, whose judgments are given to us in the Bible, and the Fathers of the Church, especially Augustine, were the highest human authorities. The realms of human knowledge were divided among several authorities, subordinate to faith, but otherwise presumed true: Aristotle in philosophy, Galen in medicine, Thomas in theology. An authority, once established, could be displaced only with effort. Nevertheless in some fields they were: in anatomy, for example, Vesalius rapidly took the place of Galen after 1570.

The new philosophers of Descartes's generation often portrayed their predecessors' attitude to authorities as one of unquestioning agreement. It is more illuminating to consider it in terms of trust and burden of proof. An authority has the presumption in their favor, and the burden lies more or less heavily on those who disagree to refute the claims of authority. God's authority alone is absolute. Human authority is limited not only by faith but by experience: Aristotle's opinion that the world is eternal was rejected first of all because it contradicts Genesis; philosophers endeavored *also* to show that it is inconsistent with experience.

Many events conspired in the sixteenth century to cast human, and even divine, authority into doubt. The familiar list includes the discoveries of the New World, the theories of Copernicus, schisms within the Christian Church and the wars that resulted from them, political turmoil and economic distress. Philosophical skepticism, revived from the ancients, was invoked to debunk the claims of authority. Descartes, unlike true skeptics in his period, held that human understanding, assisted by method and freed from the bonds of prejudice, can effectively replace authority in the pursuit of knowledge. He carefully shielded religious and political authority from doubt; but in natural philosophy and metaphysics he held that human understanding alone has authority. A letter to Beeckman in 1630 records his view that what I have reasoned my way to I have learned as if by my own power only (AT 1:160). If others have told me those things, that was at most only an occasion for my thinking about them. In such an economy of knowledge there is no place for authority.

Reliance on authority did not preclude appeal to experience. *Experimentum* (or *experientia*), which in Descartes's time was used indifferently for what we now distinguish as experiment and observation, denoted first of all an empirical truth vouched

for by common experience (Dear 1988). On such matters each of us, or the “common sense” of all, is an authority: fire burns, plants grow from seeds, animals reproduce their own kind. An *experimentum* can also be an empirical truth vouched for by a trustworthy author. Pliny’s *Natural history* supplies many unusual observations concerning plants and animals. The human body dissected is not part of everyday life. But Vesalius’ *De humani corporis fabrica*, given his authority, yields reliable claims about its anatomy.

Of the *experimenta* mentioned in textbooks, very few are first-hand reports. They seldom describe the manipulation of objects so as to yield new phenomena – “experiments” in our sense. That, more than any supposed incapacity or refusal to read the book of nature, distinguishes the role of experience in Aristotelian natural philosophy. The construction of devices by which to produce or reproduce natural phenomena (Galileo’s use of balls rolling down inclined planes, Boyle’s air-pump), the generation of new phenomena with the express aim of testing hypotheses, the recording of results in first-person dated accounts – all this, though not entirely absent from Aristotelian science, was incidental to the achievement of its aims.

Experimenta supply probable reasons in argument. They are often brought forward in conjunction with *a priori* arguments to the same conclusion. Suárez, for example, adduces both *experimenta* and *a priori* reasons to show that the powers of a natural body must be united in a form. Arguments on the existence of the void (Schmitt 1967) included *a priori* reasons (Aristotle’s argument, for example, that the motions of bodies in a void, which offers no resistance to them, would be incommensurable with motion in any medium) and *experimenta* (the air in a sealed vessel forces its way out violently when the vessel is heated) (Schmitt 1967).

Descartes’s use of *experimenta* remains in many ways close to that of the Schools. Like them, he combines *a priori* arguments with *experimenta*. The empirical basis, moreover, for the analogies he so often appeals to is common experience; and the phenomena he attempts to explain are for the most part drawn either from everyday experience or from other authors. The table of angles of incidence and refraction in the *Dioptrique* comes from Witelo; the anatomy of the *Traité de l’homme* from the treatises of Caspar Bauhin and others (Bitbol-Hespériès 1990). It is not in the production of new phenomena that the novelty of Descartes’s natural philosophy is to be found, but in his conception of corporeal substance and the ideal of mechanistic causal explanation.

Body as Substance

Body is first of all substance. An individual body is a “complete” substance composed of two “incomplete” substances, matter and form. The term *incomplete* registers the fact that neither matter nor form can exist naturally except when joined with the other in an individual body. The term *substance* was, following Aristotle, defined in two ways: logically, as an ultimate subject of predication, and ontologically, as an individual capable of subsisting apart from any other individual.

Substance defined in the first way is contrasted with *accident* – with things that ordinarily only exist “in” another, as heat exists only in hot things. The relation of accidents to the things they exist in was called *inherence*.

Substance defined in the second way is contrasted with any entity that, even by God's absolute power, cannot exist apart from all others. Substance in this sense is contrasted with *mode*. The relation of modes to substances I will call "ontological dependence."

Figure, for example, is a mode (Suárez 1965, 25: 615). It cannot exist apart, even miraculously, from the figured thing; the definition of figure essentially presupposes the existence of the quantity of which it is the figure. The definition of the human soul, on the other hand, though it will make reference to the body as that to which the soul is naturally joined and through which it exercises some of its powers, does not presuppose the existence of the body; one of the standard arguments for its immateriality is that some of its powers can operate without an organ, and thus that the human soul, as the seat of those powers, can exist apart from any material substrate.

In his polemics against the Schools, Descartes has two *bêtes noires*: "real qualities," as he calls them, and substantial forms. The rejection of real qualities amounts to an identification of inherence with ontological dependence; the rejection of forms is part of his program in physics of restricting the properties of bodies to figure, size, and motion.

The first bête noire: real qualities

By "real qualities" Descartes means qualities which, like the sensible qualities of the Host after transubstantiation, were supposed to subsist even though the substance in which they had inhered was annihilated and replaced by the body of Christ. In the Thomist account of transubstantiation, the sensible qualities of the Host were said to inhere in its quantity which, once the matter of the Host is annihilated, itself inheres in nothing. Quantity, then, could not be a mere mode of substance; it must be a *res*, a thing, capable, as substances are supposed to be, of existing apart from any other thing. Essential to being an accident is not *actual* inherence but only *potential* inherence; accidents have this, substances do not (Fonseca 1964, 3: 199).

The term *real* in this context (Latin *realis*, from *res*, "thing") is likely to mislead readers now. Whether Descartes thought that sensible qualities like color and heat are real in current senses of that word is a delicate question; but when he denies that they are "real" qualities, he is not denying that they have some sort of existence independent of our conception of them, he is denying that they are *res* – that they can exist apart from their ordinary subjects of inherence. Having identified inherence with the ontological dependence of modes on substances, Descartes concludes that the doctrine of real qualities says of them that they are and are not substances, which is plainly contradictory. Not surprisingly, he refers to the doctrine with disdain.

For Suárez, a *res* or thing is "that which of and in itself is something in such a way as not to require being always intrinsically and essentially affixed to another"; nor can it be united with another except "by a medium in some way distinct by nature from it" (Suárez 1965, 25: 257). Not only bodies but also their sensible qualities are *res* in this sense. Inherence, as the relation of a sensible quality to a subject, is thus distinct from the ontological dependence of modes on substances.

Res are contrasted with modes, whose nature requires that they be "affixed to another." A mode includes in its definition, its "essential reason," an intrinsic

dependence on something else: in considering the definition of “figure,” say, we can see that “figure without quantity” is contradictory, and that not even God can conserve the figure of a thing without its quantity. If we consider the definition of color, on the other hand, we should find – since colors for Suárez are *res*, and capable of existing without their ordinary subject – that it does not include an intrinsic dependence on something else actually existing. Color, unlike figure, does not intrinsically depend on quantity, even if, in the ordinary course of nature, it occurs only in quantified substances.

In the *Principles* Descartes, like Suárez, divides things into substances and the modes that are ontologically dependent on them. But he has no use for any distinction between inherence and ontological dependence. Corporeal substances are either identical or really distinct; the only other relation he admits is that of mode to substance. Since the essence of body is extension (which here we can take to denote what the Aristotelian term *quantity* denotes), everything that pertains to body must be a mode of extension. In particular, colors and other sensible qualities, if they exist at all in bodies, must be modes of extension.

One motive for ridding the world of real qualities, and thus for eliminating inherence, was that if colors are not just modes, the program of restricting the explanatory apparatus in natural philosophy to the modes of extension will fail. Descartes was bound therefore to deny that sensible qualities are *res* (Menn 1995: 194). He does not, on the other hand, show that they cannot be modes of extension, taking for granted, I think, that his usual list – figure, size, and motion – would be treated as exhaustive.

The second bête noire: substantial form

The object of natural philosophy is body, more precisely (since metaphysics also treats body as substance) body as changeable – *ens mobile* (Toletus 1985, 4: 4). That there is change in the world and that the senses yield true beliefs about change the Aristotelians never doubted. The fact is certain: what remains is to provide a scheme for describing change and to determine its causes. Physics proper, in addition to defining matter, form, and change, sets out the four sorts of cause and proves that there is a first cause of all change, a *primum mobile*. The more specialized parts of natural philosophy consider particular kinds of body and the causes and effects peculiar to them.

Body, or corporeal substance, Aristotle says, is a composite of matter and form. The basic argument for the distinction, a version of which can be found already in Plato’s *Timæus*, is this: even in the most radical changes – the death of an animal, the transmutation by heat of water into air – some component of the thing changed must of course be different, but some component must be the same. Otherwise we could not say *this* thing has changed; we would have to say that one thing had been replaced by another. What persists through change is the *matter* of the thing (with respect to that change); what differs is *form*.

By itself the argument yields little. It does not show that in each thing there is *one* matter that persists through all its changes; and because a thing can typically undergo many sorts of change, the argument would seem to show that it must have many forms. Nevertheless the Aristotelians held that in every natural thing there is one form that deserves to be called *the* form of that thing: its “substantial” form. In a living thing, for

example, the soul is the substantial form, accompanied by many “accidental” forms – the quantity and qualities of body and soul. There is also in every natural thing a first or “prime” matter that persists even when the thing is destroyed or corrupted to the point of becoming, as an animal does in death, another kind of thing.

Corporeal substance is, first of all, a composite of substantial form and prime matter. In the form certain *powers* inhere, most importantly the active powers characteristic of the species to which the substance belongs. Cats have the active powers of locomotion and appetite and the passive powers of seeing, hearing, and so forth. Those powers, in order to operate, require certain *dispositions* in the body – particular temperaments or mixtures of the elements, particular shapes, and so forth. The eye, for example, is round and contains a crystalline humor suited to the reception of color.

The role of substantial form in this scheme is twofold. It is the seat of the powers of a body, the source from which they all spring; and because the basis upon which bodies are classified into kinds is primarily the powers and dispositions associated with each body, that classification is based upon the form by which those powers and dispositions are determined. For that reason, form, considered as a cause, is said to give “specific being” to substance.

Descartes holds that form is an idle wheel in the machinery of physics. Aristotelian authors, however, knowing that some philosophers had denied the existence of form, took care to offer not only conceptual but empirical arguments for postulating, in addition to the qualities revealed to us by the senses, a form in which those qualities were united and by which they are brought into existence.

I will mention one such argument. On the basis of various *experientia*, Aristotelian authors hold that a distinction must be made between *accidental* change, in which a thing changes but remains of the same kind, and *substantial* change, the result of which is a new kind of thing. A standard example is the heating of water. In moderation, it merely alters the “intensity” of a certain quality. But *in extremis* it turns water into what they considered to be a distinct kind of thing – the element “air.” This second sort of change is all-or-nothing, irreversible, and accompanied by a wholesale alteration of the accidents of the water. What was heavy becomes light, what was cold becomes hot, and so forth. The phenomenal distinction thus made between two sorts of change is best explained, the Aristotelians believed, by postulating a distinction between the “accidental” qualities of the thing and its substantial form, so that substantial change is the replacement, not merely of one accident by another, but of one substantial form by another, together with all the changes implied by that (Suárez 1965, 25: 501–2).

In Cartesian physics there is, fundamentally, no way to distinguish substantial from accidental change. Material stuffs consist of corpuscles whose shapes are continuously deformable into one another. In principle lead could be made into gold by mere local motion. Boyle, who unlike Descartes attempts to refute the empirical arguments for form, argues that the phenomenal distinction is one of degree only. To preserve the commonsense view that there are different kinds of stuff he supposes that the corpuscles of a homogeneous stuff like iron or water share the same shape or “texture,” assuming implicitly that texture has the requisite stability (Boyle 1991).

Had the role of form in physical explanation alone been at issue, Descartes could have contented himself with substituting for the obscure Aristotelian notion his own clear and distinct notion of figure. But the Aristotelian holds that substantial form is

itself substance, and really distinct from matter (Fonseca 1964, 2: 82). If we consider only what form is according to its essential definition – as “that which gives specific being to matter” – and we take the definition to require not actual, but only potential “giving of specific being,” then it is not contradictory to suppose a form could exist without its matter. God, who can bring about whatever is not contradictory, could bring this about; the separated human soul is evidently just such a case.

Form neither inheres in matter nor does it ontologically depend on matter. Its relation to matter is the *sui generis* relation of union. Except in the human case, Descartes has no need of this relation, no more than he has for a relation of inherence distinct from ontological dependence.

Superfluous too are the quasi-substances form and matter, along with “real qualities.” Each of these includes in its essential reason a relation, which need only be potential, to something else from which it is really distinct – of form to the matter that gives it particular existence, of matter to the form that specifies it, of qualities to their subjects of inherence. In Descartes’s world, on the other hand, only things whose essential reasons are wholly independent are really distinct. The essence of body contains nothing that pertains to mind, and that of mind nothing that pertains to body (imagination and sensation, which ordinarily require bodily organs, are not part of its essence strictly speaking). Whatever is not wholly independent of a thing must be wholly dependent on it, and cannot exist without it, not even by God’s absolute power. There is no middle ground.

Matter and quantity

Bodies are composite of form and matter. Requiring union with matter to exist naturally is the defining character of material form. Spiritual forms, though they can interact with matter, never join with it to form a complete substance. In the late sixteenth century and the early seventeenth there was notable uncertainty concerning the essence of matter, an uncertainty that the best efforts of the Aristotelians, and of Descartes too, failed to dispel.

One point of agreement was that bodies ordinarily occupy space. In an Aristotelian context, occupying space is proper to things having *quantity*. The understanding of matter thus begins with the definition of quantity. Among the Aristotelians there was serious disagreement. Each of the major schools had its own view, and even among the Jesuits there were differences – the Coimbra commentary agrees with Thomas that the essence of matter is *pura potentia*, Fonseca and Suárez do not. The positions I describe are those of Fonseca and Suárez.

Quantity is divided first into discrete and continuous. Continuous quantity is again divided into intensive and extensive. Intensive quantity is a property of qualities like heat, impetus, and courage that admit of degrees. Lengthy questions were devoted to the waxing (*intensio*) and waning (*remissio*) of qualities. Descartes ignores the issue. In his physics, local motion alone admits of degrees, and those degrees are measured by comparing the distances – distance or length being an extensive quantity – traveled by bodies in equal times.

Extensive quantity has three distinguishing features: it is the measure, as Aristotle says, of substance; it admits of division into integral parts, each of which is capable of

existing separately; and it confers on matter the capacity not only to be present at, but to occupy distinct spatial places. Each of these features had been put forward as the essence of quantity. Fonseca and Suárez (who cites Fonseca) argue for the third. Following Scotus, Fonseca holds that the definition or “formal reason” of quantity is to be *per se* extended (qualities like color are extended too, but only *per accidens*, as the accidents of quantified substances) (Fonseca 1964, 2: 639). Suárez holds the formal reason of quantity is not actual but potential extension, not the actual occupation of space but an aptitude or habitude toward doing so (Suárez 1965, 26: 547). Actual extension, then, is the “formal effect” of quantity, not quantity itself. From that effect the other features, measurability and divisibility, of quantity follow.

Descartes holds that there is nothing more to matter than extension, from which it follows that a material substance and its quantity are not really, or even modally, distinct. His position is, in almost so many words, that of Ockham, who argued that there is no real distinction between substance and quantity. From substantiality alone the three distinguishing features of quantity already follow, and since a real distinction must not be introduced without a compelling reason to do so, there is no reason to hold that substance and quantity are distinct except in our conception (Suárez 1965, 26: 533).

It is worth dwelling for a moment on the Jesuits’ replies to this argument. The first is that in the Eucharist, the substance of the bread and wine is annihilated, and replaced with the body and blood of Christ; the quantity, nevertheless, and the sensible qualities of the bread and wine must remain, since after all they appear to the senses just as before. Quantity, therefore, can exist without substance. But if substance could not exist without quantity, it would be a mode of quantity, which is evidently false. Substance and quantity are therefore really distinct (Suárez 1965, 26: 534). Descartes encountered the same argument from Arnauld in the Fourth *Objections*. His difficulties in responding to it – then and later – were among the grounds on which Cartesian natural philosophy was condemned after his death (Armogathe 1977).

Suárez, acknowledging that the first reply to the Ockhamist argument rests on accepting the “mystery” of the Eucharist, holds also that the capacity of bodies to keep others from occupying their place – impenetrability, in short – is not the effect of substance alone. From the essence of substance (which is, as we have seen, the possibility of existing separately), or from that of matter, impenetrability does not follow. Ockham’s razor cannot be applied; quantity must be distinct from substance and from matter.

If quantity is distinct from matter, it cannot be part of its essence. What then is the essence of matter? The Thomists held that because not only quantity but all the other accidents of substance exist in substance by way of form, matter, considered by itself, has no other essence than that of potentially receiving form and all that comes with form: it is *pura potentia*, “pure potency.” God is *actus purus*, “pure act”: everything that God can be, he is. Matter is, in this respect, as distant from God as anything that is not nothing can be. God has all perfections, matter has none, not even that of existence.

Descartes’s name for that which lacks all perfection is *nothing* (AT 7:54). Indeed, it is not easy to understand how an entity having no existence of its own could be joined with form to generate something new – a complete substance. Even the Coimbrans, who agree with Thomas, hold that matter has an existence of its own, even when it is not joined with form. Its existence is imperfect and incomplete, so much so that in the

ordinary course of nature matter cannot exist without form. That matter has an essence which is not just *pura potentia* is indicated by the fact that, although it is receptive to every form (and in that limited sense *pura potentia*), it receives forms only in a certain order. The forms of the elements are received first, then those of mixtures like blood and flesh, and finally higher forms like those of plants and animals. Suárez, noting that the receptiveness of matter to quantity is a natural precondition to its union with form, holds that being receptive to quantity is proper to matter. The *potentia* of matter is biased, so to speak, and therefore not *pura*.

In this setting, Descartes's position – that the essence of body is extension – has two distinguishing features. The first is that body in general is already a substance in its own right, whose “form” is extension. Extension, like form, confers substancehood on whatever has it, and generically distinguishes material from spiritual substances; in these respects, and because all the properties of bodies are supposed to follow from extension, it resembles substantial form. But only up to a point: in Descartes's physics, there are no individual or specific substantial forms. The differences between natural kinds are all of the sort that an Aristotelian would call accidental. Unlike form, moreover, extension cannot be separated from its “matter” even by God.

The second noteworthy feature is what might be called Descartes's super-nominalism. At the outset of his career, in his collaboration with Isaac Beeckman, Descartes already committed himself to a physics in which bodies are conceived to have only “mechanical” properties, namely, the modes of extension. In the *Rules*, we see him arguing already that extension and body cannot be clearly distinguished (AT 10:444–5). In *The World*, a few years later, the matter of his hypothetical universe is supposed to consist only in extension (AT 11:33). Descartes there begins to make ontology conform to method. But only after renewing his acquaintance with the School philosophers in the late 1630s did he formulate, in terms most likely taken from Suárez, the ontology of created things as one of substance, attribute, and mode; only then did he identify space, quantity, and matter. Like Ockham, Descartes holds that a body and its quantity are distinct only in our conception. But unlike Ockham he takes quantity – that is, extension – to constitute the nature of body, and infers that every accident of body is a mode of extension.

Change and Causes

In Cartesian physics all change is local motion, and all causation is efficient causation. God and the human mind, the only active powers in Descartes's world, intervene in nature but lie outside the purview of its laws, and so also outside natural philosophy. Because they do, consideration of ends must likewise be excluded from natural philosophy: agency, ends, and cognition cannot be separated. Descartes was in this respect more radical in his departure from the Schools than most of his contemporaries and successors. Some of them, notably Leibniz and the Cambridge Platonists, tried to reinstate notions of agency and end. To understand what was at stake, it is essential to keep in mind the fundamentals of Aristotelian theories of agency and the role of ends in nature. Our intuitions, being Cartesian, are likely to mislead us when we turn to the seventeenth century: the framework we take for granted was then still in flux.

Aristotelian natural philosophy is saturated with purposiveness. Natural change, properly understood, is directed change. Blind efficient causes and mere motion from place to place are marginal, limiting cases. A world like Descartes's was not unthinkable: the Aristotelians had, after all, the examples of Democritus and Epicurus to consider. But to conceive of natural change in their manner, or in Descartes's, would in their view have precluded knowing the natures of things and the true causes of change.

Actual and potential

Fundamental to the Aristotelian conception of natural change is the distinction between *actus* and *potentia* ("act" and "potency"). A thing is said to be *in potentia* such-and-such if, given a suitable agent and an environment free of hindrances, it will, in the ordinary course of nature, become such-and-such. Being *in potentia* such-and-such entails being possibly such-and-such, but it usually has the richer sense of *tending* to become such-and-such, by virtue of some real feature. The seed is *in potentia* a mature organism, not merely by virtue of its being logically possible for it to be one, but by virtue of some real feature that the seed now has.

It makes sense, therefore, to regard a thing which is *in potentia* such-and-such but which has not become such-and-such as imperfect, as having been hindered in its development. People normally acquire the sense of vision; a person who lacks vision is not just a "not-seer," as a stone might be said to be; a human "not-seer" is *blind* – deprived of vision, hence lacking what a human being, by its nature, should have.

Ontologically, *actus* is just existence. The *actus* of my power to speak is an existing utterance. But *actus* is not existence *simpliciter*. It is existence conceived as a fulfillment or perfection that follows, under normal circumstances, from the nature of the thing whose *actus* it is. *Actus*, moreover, is a relational, not an absolute designation. An *actus* may itself be a *potentia*. Among the *actus* of my soul is the power of memory, which is itself a *potentia* whose *actus* is the recording and recollection of perceptions.

Natural change, or *motus*, is "the *actus* of a being *in potentia* insofar as it is *in potentia*" (Coimbra 1984, 1: 350). Descartes cites this as a piece of Scholastic nonsense (AT 11:39), but Aristotle's commentators, though they disagreed about its interpretation, had no trouble making sense of it. I think it is best understood as a schema by which to pick out, in a thing that is changing, just what the change consists in. Heating is the *actus* (an actually existing quality of heat) of the thing heated (which is *in potentia* hot or at least hotter) insofar as it is *in potentia* (not yet as hot as it is going to be, or as it is naturally capable of becoming). Aristotle's definition directs us to consider in any natural change the condition of the thing changed by virtue of which it initially admits of being changed in that way, together with the *terminus* or natural stopping point of that change. Change, at least in the central cases, is always directed.

Natural change is inseparable from agency. More precisely: "These five are to be considered in every action: the agent, the patient, the form which is brought about, the *fluxus* of the form, and the various respects or relations consequent upon them" (Toletus 1985, 4: 86rb). The form is the terminus of the change, the "flux" is the *motus* itself. Some Aristotelians held that the flux is a stage of the form itself designated as a member of a succession of forms, others that it was somehow distinct; we can set that dispute

aside. The agent is the efficient cause of the form, which is received in the patient, as heat is received in earth from the sun; but even though the form is said to be “received,” nothing passes from the agent to the patient. The form that results from the change is newly generated in the patient – “educed,” as the common view put it, from the *potentia* of the patient’s matter.

From the asymmetry of agent and patient it was thought to follow that the agent is not changed in acting, except incidentally by reciprocal action or by way of improving the capacity of the patient to serve as its instrument. I become a better craftsman by building better tools, but strictly speaking only the tools are perfected, not me. It follows also that action, passion, and *motus* are not really distinct. “Action” denotes the *motus* insofar as it is related (causally) to the agent, “passion” denotes the *motus* insofar as it is, or results in, a form in the patient. Thus Descartes, when he says that action and passion differ only in reason, was merely repeating a commonplace (AT 3:428, 11:328). The *motus*, it should be noted, is unambiguously an accident of the patient; Descartes, in identifying action and passion, probably did not intend that we should think of the passions of the soul as joint modes of mind and body.

Cartesian physics has little use for the agent-patient scheme. Its basic event is the collision of two bodies, an event in which there is no asymmetry by which to distinguish agent from patient. In Cartesian psychology, on the other hand, voluntary action presents us with an evident asymmetry between mind and body: mind is the agent, will its active power. But Descartes also applies, not so aptly, the scheme of agent and patient to sensation. In the sixth Meditation, the passivity of sensation is necessary to the proof of the existence of body, which is, it would seem, the *agent* of sensation. The difficulty is that bodies have no active powers. If the scheme was seriously meant to be applied to sensation, God, it would seem, would be the agent. But one might also take Descartes to be altering, as he did in other instances, the sense of a term borrowed from the Schools: here, perhaps, “patient” means no more than “thing affected,” and “agent” no more than “causal antecedent.”

Causes in general and the efficient cause

The matter-form account of substance is combined with the agent-patient scheme of change in the Aristotelian system of the four causes. The *material* cause of a thing is its matter, and the *formal* cause its form. The agent or quality of the agent that brings it about that the matter has that form is the *efficient* cause, and the end for which the agent acts is the *final* cause. The reason under which matter, form, agent, and end are rightly called causes is, Suárez argues, that each in its own manner “gives being” to its effect. Suárez uses the phrase *influerre esse*, “to inflow being”; the model here is God, who in creation imparts, out of the fullness of his own being, existence to all created things. The “influx” here is not a *transfer* of being but rather a kind of *assimilation* of creature to God with respect to perfection, the most fundamental of which is existence itself. So too in ordinary causal relations nothing is transferred from the cause to the effect. The sun does not lose its heat by heating the earth; it elicits from the substance of earth the quality of heat which hitherto has been in it only potentially.

The material and formal causes we have seen already. As for the efficient cause, it is worth noting first that Descartes agrees with the Aristotelians on what might be

called its formal aspects. Efficient causes necessitate their effects; they precede them in time; there is no action at a distance; “nothing comes from nothing,” and so the more perfect cannot be brought into existence by the less perfect. The application of the principle in its general form presupposes an order of degrees of perfection (or, in Descartes’s formulation, “reality”). Accidents, since they are dependent beings, are less perfect than substances and cannot cause them; material forms cannot cause spiritual forms.

Descartes’s innovation was to initiate a parting of the ways between (efficient) causation and (active) power. Descartes has no qualms about saying that one body *causes* another to move. But he denies that any body has the *power* to move another. The question here raised was treated in the Schools under the heading of the “efficacy of second causes.” God is the first cause, and evidently an active power: are there any others? Already in Islamic Aristotelianism it had been argued that God is the only active power. Created things are merely “occasional” causes of change, where an occasional cause satisfies the formal conditions on efficient causes, but which is supposed not to *initiate* the changes it brings about. Occasionalism was a constant temptation for philosophers who held that the world is created and sustained by an omnipotent deity. Almost everyone agreed that God *can* perform the office of any creature; but then it is not easy to see why active power should be attributed to anything else: why should the world not depend on God in this respect as it does for its existence?

Aristotelian authors argued at length for the efficacy of second causes – the human will first of all, but also natural agents. One alternative – that second causes are efficacious and entirely independent in their operation from God – was ruled out from the start. The favored alternative was to hold that God *concurs* in the acts of creatures – that he cooperates with them in the production of their effects, but in such a way as not to deprive them of their own efficacy. Descartes’s position was clear with respect to the human will: it is an active power, genuinely efficacious. With respect to bodies, his position was ambiguous and remains a matter of dispute. It is worth noting, however, that (the case of the will aside) the considerations urged on behalf of the efficacy of second causes by the Aristotelians would have had little force for Descartes. He could, moreover, count on the Aristotelians’ agreeing that *if* body is nothing other than extension, then indeed bodies can have no active powers. Extension, as Descartes well knew, is in the Aristotelian world utterly inert.

Ends and final causes

In the Aristotelian world, ends are everywhere. In the Cartesian, there are ends only where there are minds. That difference is not so radical as it might seem. Unlike Aristotle himself, Aristotelians in a theistic setting tended to restrict ends as causes to those which are cognized by a rational agent. Irrational agents – inanimates and non-human animals – have ends only derivatively, as means to divine ends.

For the Aristotelian, the question is not whether nature acts according to ends (if we take those ends to be God’s). Rather, it is how ends can be understood as causes. Part of the answer is easy: an end “gives being” to a thing by virtue of being its completion or perfection – the actualization of its nature. Actuality is existence: the perfected thing has more being or more reality than the imperfect thing.

The causality of ends was understood by invoking, first of all, the familiar scheme of intentional action: the thought of the end moves the will to act toward that end. But it might be said – and some medieval philosophers *did* say – that then the end comes out as a special sort of efficient cause. Suárez and the Coimbrans, who were familiar with that argument, argued that nevertheless the causality of ends is distinct from that of efficient causes. The end acts on the will not simply as something cognized; it acts under the “formal reason of goodness.” My thought that eating the apple in front of me promotes health is part of the efficient-causal explanation of my eating it; but being thought of, though necessary to the will’s being moved, is only incidental to understanding how it is that eating the apple becomes an *end* toward which I act. The healthiness of eating the apple – eating considered under the “formal reason” of perfecting the body – must be invoked.

Art and Nature

Descartes’s natural philosophy, and especially his physiology, makes abundant use of analogies between human artifacts and natural things. Living things are just configurations of extended matter; they differ from human machines only in complexity. From the structure of human machines we can thus infer, on the basis of similarity in operation, the structure of living things. In Aristotelian physics, on the other hand, the utility of art in generating knowledge by analogy about the powers of natural things is strictly limited. Art, even though it is said to imitate nature, cannot serve as a model, because human production is by comparison with divine creation secondary, superficial, and subordinate.

1 Secondary That art imitates nature, and is thus secondary to it, is obvious in the case of the arts of depiction. Other arts – carpentry, tailoring, cobblery – though they do not imitate preexisting natural effects, imitate those that “ought to have preexisted” and strive to fashion them as nature would have (Toletus 1985, *Phys.* 2c2q6; 4: 54v). The claws, fur, fins that nature gave to animals nature gives us by endowing us with an intellect capable of conceiving the forms of all those tools. Human art can thus attain to a more direct imitation of the divine mode of production than is realized by natural agents.

Nevertheless art could not exist without the creative act of God and the generative acts of nature. God realizes in matter the exemplars or divine ideas of the forms of things. The active powers of nature execute the divine plan, generating substances composed of prime matter and substantial form, supported and embellished by suitable qualities. Art operates only on the finished substances of nature. Unlike God, it cannot create from nothing; unlike nature, it cannot reduce an existing substance to prime matter and give it a new substantial form.

2 Superficial The forms of art are not the substantial forms of things, but their figures, their outward shapes. Figures follow forms. They are the attendants of form, the indices of substance. Human art cannot bestow on matter new substantial forms. To imitate the effects of natural substances on vision it can only employ the signs of form, that is,

the shapes of things. This holds not only for the arts of depiction but also to some degree for the other arts: the rudder of a ship may look like a tail, but it is only by courtesy an organic part of the ship. Art remains at the surface.

Arriaga holds that the forms of art consist merely in the locations (*ubicationes*) of preexisting substances. All we change is the *ubi*, the “where,” of various bits of stuff. The forms of artifacts are simply displacements of their materials (Arriaga 1632: 319; see Des Chene 1996: 245). In those arts which, like baking and cooking, do not merely move things around, the human contribution amounts only to the application of natural powers to suitable patients, as fire to dough. Nature, not art, produces whatever new forms are thereby generated; art merely provides the occasion.

3 *Subordinate* Nature’s powers are subordinate to God; human industry is subordinate both to nature and to God. God, the Coimbrans write, brings forth (things) from nothing: nature from the potential being; art from perfected being; God by creating, nature by generating, art by compounding or composing (Coimbra 1984, 1: 214).

Natural forms are “active [*actuosæ*] and as if alive.” But the forms of art are “as if inert [*stolidæ*] and dead, having no effective force [*effectricem vim*].” They are nothing more than reshapings of things. But shape pertains to quantity, and quantity “of itself is idle [*ignava*] and inert; it is given by nature [to things] as if it were another matter, to sustain their accidents.” Figure inherits from quantity its passivity. Art, in short, has no effects as such; and if the nature of a thing is, as Aristotle says, its principle of rest and motion, then artifacts have no natures.

The contrast could hardly be greater. Art deals only in the surfaces of complete substances, its forms are mere shapes, it is inert – more so than even the inanimate substances of nature. Nature, on the other hand, works from within and needs only prime matter for its material; the creatures of nature not only have active powers but are capable of conferring those powers on others.

Yet there seem to be instances in which art exceeds the limits thus set for it. The Coimbrans consider three cases: automata, magical figures and characters, and alchemy, to which they devote a special question (on the relations of art and nature in alchemy, see Newman 2004). The statues of Dædalus, the dove of Archytas, and the animated stools of Apollonius of Tyana all seem to have possessed powers not unlike those of living things. Likewise the images and amulets produced by astrologers and natural magicians seem to exceed in their effects the powers of natural agents. And if alchemists can indeed generate gold from base metal, as they say, art will have managed not merely to relocate bits of stuff but to impose a new substantial form on prime matter.

But all this is either fakery or can be ascribed to natural causes. “Neither art nor artificial form by its own power is capable of the work of nature” (Coimbra 1984, 1: 218). If witches and magicians sometimes seem to endow figures and characters with active powers, the actions they bring about are, if not illusory, due to “the industry of demons who at the sign [given by the witch] hasten by tacit or express agreement to play with the minds of men.” The instruments of witchcraft are just visible manifestations of the witch’s intentions. In other cases ordinary natural causes are at work, and the appearance of activity in an artifact is owed to the concealment of those causes. So it is with automata, whose actions are brought about by “little machines hidden within,” which act in perfectly natural ways.

Concerning alchemy, the Coimbrans' conclusion is a bit of a surprise: "Even if it is extremely difficult to produce true gold by chemical recipes, still it does not seem that one can judge it entirely impossible." If gold has hitherto been made only under the earth, that is merely because only there have the requisite matter and the requisite agents been brought together. But the natural processes that produce it can occur anywhere, even in the alchemist's den.

Having thus approached what we would call a modern view of the matter, the Coimbrans immediately retrace their steps. They remind the reader that in fact no one has demonstrated the art of making gold. In every case the product was either not true gold or, if genuine, was surreptitiously introduced during the process. Alchemists therefore deserve their bad name. And if the day comes when gold is made by art, it will be by way of applying natural agents to suitable materials. Art itself will remain an inert bystander. Alchemy, like natural magic, tests the limits of art but cannot exceed them.

Human art, even if it manages to produce substances, remains subordinate to nature. In Descartes's natural philosophy, the subordination of art to nature is not altogether rejected. But the difference between human and divine art no longer turns on the all-or-nothing presence or absence of generative powers. It is instead the difference between the finite and the indefinitely large, a difference in number and intricacy of parts. Human art is only accidentally, not essentially, subordinate to nature. The barrier between art and nature is thus displaced. Art is, one might say, that which is actually made in accordance with our desires; nature is that which is not, or which is only potentially so.

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Chapter 3

Descartes and Augustine

CATHERINE WILSON

Descartes's relationship to his predecessor, the fifth-century Bishop of Hippo, St. Augustine, has attracted much scholarly interest and commentary. Among the Fathers of the Early Church, St. Augustine was preeminent in establishing Christian doctrine. His theories of sin, the human will, angels and demons, the relationship of temporal to religious authority, and the nature of the soul remained authoritative for centuries. Even with the appearance of St. Anselm and St. Thomas Aquinas, representing a more intellectual approach to the synthesis of philosophy and theology, Augustinian Christianity influenced both Catholics and Protestants, including Luther and Calvin. Not until the end of the seventeenth century did Augustine's influence begin to wane, and in certain Christian sects it has always remained strong. The relationship between the medieval theologian and the early modern philosopher raises many historiographical questions, both text-internal, with respect to their respective doctrines and arguments, and text-external, with respect to Descartes's own position and influence in the intellectual communities of the seventeenth century.

There are a number of parallel thoughts and arguments in the writings of the two thinkers, and it will be worthwhile briefly to cite certain striking passages. Descartes reported in his *Discourse on Method* of 1637 that at one point in his life he had engaged in some very unusual meditations, perhaps "too metaphysical and uncommon for everyone's taste" (1:126; AT 6:31). He had decided to reject as false everything that it was possible to doubt. He had then established that, even if he was the victim of an illusion with regard to everything that he seemed to experience and to have learned through the use of his senses, he at least existed:

I noticed that while I was trying thus to think everything false, it was necessary that I, who was thinking this, was something. And observing that this truth 'I am thinking, therefore I exist' was so firm and sure that all the most extravagant suppositions of the skeptics were incapable of shaking it, I decided that I could accept it without scruple as the first principle of the philosophy I was seeking. (1:127; AT 6:32)

Another version of the realization of the fact of his own existence in the face of doubts about the existence of a world was presented in the *Meditations* of 1640:

I have convinced myself that there is absolutely nothing in the world, no sky, no earth, no minds, no bodies. Does it now follow that I too do not exist? No: if I convinced myself of something then I certainly existed. . . . [A]fter considering everything very thoroughly, I must finally conclude that this proposition, I am, I exist, is necessarily true whenever it is put forward by me or conceived in my mind. But what then am I? A thing that thinks. What is that? A thing that doubts, understands, affirms, denies, is willing, is unwilling, and also imagines and has sensory perceptions. (2:17; AT 7:24–5; cf. 1:127; AT 6:32)

These “uncommon” thoughts had, however, been anticipated in Augustine’s *On the Trinity*. There, Augustine maintained that we have an immediate knowledge of our own existence and thinking, that this knowledge is acquired by non-sensory means, and that no mistake in these matters is possible:

[W]ho would doubt that he lives, remembers, understands, wills, thinks, knows, and judges? For even if he doubts he lives, if he doubts, he remembers why he doubts; if he doubts, he understands that he doubts; if he doubts, he wishes to be certain; if he doubts, he thinks, if he doubts, he knows that he does not know; if he doubts, he judges that he ought not to consent rashly. Whoever then doubts about anything else ought never to doubt about all of these; for if they were not, he would be unable to doubt about anything at all. (Augustine 2002: 56)

In the *City of God*, Book 11, Chapter 26, Augustine argued that, regardless of whether his experience of a sensory world was illusory or not, his knowledge of his own existence (and by implication everyone else’s knowledge of his own existence) was secure:

[W]e both are, and know that we are, and love our existence and our knowledge of it. Moreover, in these three statements that I have made, we are not confused by any mistake masquerading as truth. For we do not get in touch with these realities, as we do with external objects, by means of any bodily sense. We know colours, for instance, by seeing them, sounds by hearing them, odours by smelling them, the taste of things by tasting them, and hard and soft objects by feeling them. . . . But it is without any deceptive play of our imagination, with its real or unreal visions, that I am quite certain that I am and that I love this being and knowing. (Augustine 1968, 3: 532–3)

I need not quail before the Academicians when they say: “What if you should be mistaken?” Well, if I am mistaken, I exist . . . it is certain that if I am mistaken, I am. (Augustine 1968, 3: 533)

Although Augustine took himself to be demonstrating that he was *alive* rather than that he simply existed, the argumentation is similar. Yet despite these and other passages suggestive of close study and direct influence, Descartes persistently maintained that Augustine’s writings were unknown to him. When Marin Mersenne raised the issue after the *Discourse* had gone to press and sent him some passages from Augustine, Descartes refused to admit their relevance (AT 1:376). On November 15, 1638, his conscience may have been bothering him, for he wrote to Mersenne, “I have looked for the letter in which you quote the passage from St. Augustine, but I have not been able to find it; nor have I managed to obtain the works of the Saint, so that I could look up what you told me, for which I am grateful” (3:129; AT 2:435). When another corre-

spondent, Andreas Colvius, called his attention to the doubt argument in the *City of God* in 1640, Descartes thanked him for the reference, adding, "I went to the library of this town [Leiden] to read it, and I do indeed find that he does use it to prove the certainty of our existence." "I am very glad," he continued, "to find myself in agreement with St. Augustine, if only to hush the little minds who have tried to find fault with the principle" (3:159; AT 3:247–8). But he denied that his intentions and Augustine's were the same. Unlike Augustine, he pointed out, he had used an argument from doubtfulness to show that "this I which is thinking is an immaterial substance with no bodily element" (3:159; AT 3:247). In another letter, to Denis Mesland, written in 1644, Descartes again expressed his hopes that the accidental similarity between his views and Augustine's would facilitate the acceptance of his philosophy:

I am grateful to you for pointing out the places in St. Augustine which can be used to give authority to my views. Some other friends of mine had already done so, and I am pleased that my thoughts agree with those of such a great and holy man. For I am not the kind of person who wants his thoughts to appear novel; on the contrary, I make my views conform with those of others so far as truth permits me. (3:232; AT 4:113)

Thus Descartes tended to insist either on his ignorance of Augustine, or on the usefulness for his overall agenda of a fairly superficial but lucky coincidence. And indeed, Descartes's claim that Augustine had not used his indubitability argument as part of a demonstration of the incorporeality of the soul was justified. Augustine did not deduce that thesis from a specific set of premises. However, he followed Plato in maintaining that the human soul was an incorporeal substance with no corporeal element, and he insisted on this point frequently.

Was Descartes's dismissive attitude really representative of his relationship to Augustine, or was it another example of his notable tendency to downplay the extent to which other writers had influenced his thinking (Kamlah 1961; Menn 2003)? In April 1619, Descartes wrote affectionately to Isaak Beeckman with whom he had been studying physics: "It was you alone who roused me from my state of indolence, and reawakened the learning which by then had almost disappeared from my memory. . . . [I]f perhaps I should produce something not wholly to be despised, you can rightly claim it all as your own" (3:4; AT 10:163). In 1630, however, he turned on Beeckman, who had complained of his ingratitude, furiously: "I have never learnt anything but idle fancies from your *Mathematical Physics*," he wrote. "You should not indulge your sickness by dwelling on the fact that I have sometimes accepted what you said, for it occasionally happens that when even the most incompetent person discusses philosophy, he says many things which by sheer chance coincide with the truth" (3:27; AT 1:159). Descartes was not inclined to be generous in acknowledging his intellectual debts. However, it is significant that Antoine Arnauld, the Jansenist philosopher-theologian, before receiving satisfaction on certain points and converting to Cartesianism, cited not only some overlap, but some serious conflicts with Augustinian doctrines.

Descartes's appropriation by the theologians and philosophers of the Oratory, notably by Nicolas Malebranche, as well as by the Jansenists of the Port-Royal school, was fortunate for his reputation, according to Henri Gouhier, but indicative of no real intellectual affinity. According to Gouhier, "The soul of the Cartesian system is not that

of Augustine's," and Descartes's distancing was appropriate. "It matters little," Gouhier says, "that the cogito is found in one and in the other; it matters little that the two apologetics have recourse to the same procedures; it matters little that the two dialectics work themselves out beyond the bounds of the sensible world. Should their proceedings be rigorously parallel, should their expressions be identical, above all this there is a soul which these resemblances do not touch, and it is to this soul that a study like ours should lead" (quoted in Menn 1998: 8). Challenging Gouhier's position, Stephen Menn has argued not only for Descartes's deep indebtedness to Augustine, but also for a certain harmony of aims and intentions in philosophy. According to Menn, Descartes's goal was "roughly, to construct a complete scientific system, including a mechanical physics and ending in the practical disciplines, on the basis of an Augustinian metaphysics" (Menn 1998: 15).

These two views are not entirely incompatible. If the soul of the Cartesian system can be construed as "a complete scientific system including a mechanical physics and ending in practical disciplines," then both commentators can be right. However, it is perhaps more accurate to say in that case that Augustinian metaphysics provided a frame rather than a basis for Descartes's scientific system. Though Augustine's attitude towards the natural world and its corporeal objects is complex, reflecting the complexity of the Platonic doctrines of the relationship between the sensible and the intelligible world from which Augustine drew inspiration, he attached little importance to natural science. By contrast with Descartes, he saw it as a mostly worthless distraction from the task of perfecting one's relationship with God, and in his old age he rejected the study of philosophy – critical, analytic, speculative thought – entirely in favor of faith. The basis for Descartes's scientific system is the atomism of Democritus and his successors, together with the physiology of Galen, that is, the pagan science revived in the Scientific Revolution, of which Augustine strongly disapproved. Descartes's Augustinian metaphysics complemented the scientific image of the world rather than supporting it. It substituted monotheism for the atheism and nature-worship associated with the science, and often the metaphysics, of the ancients.

Two Seekers After Truth

Augustine's autobiographical narratives and his theoretical constructions are dominated by images of a body-in-motion and at rest. The subject of Augustine's personal history, as well as the implied subject of his philosophical inquiry, wanders, seeks, flees, and ultimately finds sanctuary and repose. As he recounted the story of his life in the *Confessions*, Augustine's youth was marked by wanton living and a sense of wretchedness that he ascribed to his involvement with bodies. Not only was he immersed in the fleshpots of the city and enmeshed in love affairs, he was tangled up in a materialistic philosophy. "[M]y conceit ranged through corporeal forms," he said, "and I defined and distinguished as fair, what is so, absolutely of itself, . . . and confirmed my argument by corporeal examples" (Augustine 1912, 1: 191). He held metaphysical views of an extreme sort: "[W]hatsoever was not stretched out over certain spaces, nor diffused abroad, nor amassed up into bulk, nor swelled into breadth, or which did not or could not receive some form of these dimensions, I thought to be just nothing" (Augustine

1912, 1: 335). He even thought of God, he says, as “some huge corporeal substance, on every side piercing though the whole globe of this world” (*ibid.*). In this phase of his life, he misunderstood the nature of the soul as well:

I set my studies . . . to consider of the nature of the soul, but that false opinion which I had already entertained concerning spiritual matters, would not let me discover the truth, yet the force of truth did ever and anon flash into mine eyes, but I turned away my panting soul from all incorporeal substances, setting it upon lineaments and colours, and swelling quantities. And for that I was not able to see all these in my soul, I verily believed that I could not see that soul of mine. (Augustine 1912, 1: 191)

The materialism to which Augustine alludes in these passages was a feature of the most ancient philosophical systems. Augustine cites Thales as the author of the system in which everything is water, Anaximenes as the author of the system in which everything is air, and the Stoics as having maintained that the principle of life, wisdom, and divinity is fire. The most powerful and comprehensive of these systems was that of the atomists; it had originated with Democritus, been developed by Epicurus, and was fully articulated in Titus Carus Lucretius’ long Latin poem, *On the Nature of Things*, a version of a lost Greek manuscript of Epicurus.

The atomists maintained that there existed only material particles and the void. The human soul was composed of especially fine and subtle atoms and did not survive the death of the rest of the body it was mingled with during life. The gods, if they were not imaginary, were material beings who inhabited distant regions of space and took no interest in human affairs, and death was the end of all experience and existence. Ethical hedonism, the doctrine that the pursuit of pleasure and the avoidance of pain were the only reasonable goals for human beings, seemed to follow (Lucretius 2001, *passim*). Plato, through his theory of separated, immaterial Forms, and Aristotle, through his doctrine of forms wedded to matter (hylomorphism), had rejected atomism and its theological and ethical implications, though Aristotle at least allowed Democritus pride of place among the pre-Socratics.

The young Augustine was deeply impressed, not only by materialism, but by the ethical doctrines of the atomists in particular. Even after he met St. Ambrose, who persuaded him of the truth of Christianity, and of the resurrection and of our accountability to God, Augustine continued for a while to believe that Epicurus had been correct in treating pleasure as the supreme good. That it was prohibited and punished by God was the only reason Augustine could find to abstain from carnal indulgence.

Nor did anything call me back from that deeper gulf of carnal pleasures, but only the fear of death, and of thy judgement to come. . . . Epicurus, in my judgement should have won the garland, had I not verily believed that there remained a life for the soul after the body was dead, and the fruits of our deservings, which Epicurus would not believe. (Augustine 1912, 1: 327)

In his search for a metaphysical system that could explain his sense of inner conflict, relieve his sense of guilt, and put an end to his confusions about how to live, Augustine turned first to Manichaeism, the doctrine that good and evil principles of equal force

struggle for supremacy in the cosmos. Finding it ultimately of no help, he turned to Platonism.

The Platonism he encountered was that of the *Phaedo*, the *Symposium*, and the *Timaeus*. These Platonic works were not valued for Socrates' skillful dialogical argument, but for their imaginative depiction of a supersensible realm of ideas or "forms" beyond the world of sensible, tangible objects. Everything in the sensible world, according to Platonic doctrine, is changeable, fleeting, and destructible, as the atomists maintained, but there exist Forms that are eternal and unchanging. Platonic ontology relegated matter to a shadowy, derivative existence relative to these incorporeal Forms, and in moral theory, Platonism took a stand against prevailing relativistic, pragmatic, and conventionalist accounts of good and evil. The *Timaeus* asserted that we can earn immortality by renouncing mundane goals and desires. "If a man has become absorbed in his appetites or his ambitions and takes great pains to further them, all his thoughts are bound to become merely mortal. . . . On the other hand, if a man has seriously devoted himself to the love of learning and to true wisdom, if he has exercised these aspects of himself above all, then there is absolutely no way that his thoughts can fail to be immortal and divine" (Plato 1997: 1289; 90b). Good actions, Platonists maintained, partook of the Form of the Good, but Platonists did not acknowledge a Form of Evil. Unlike Manichaeans and Gnostics, they held that the world, as the product of a divine creative mind, was essentially good, through and through. Yet their system could not but surround the concept of matter with an aura of shame and unworthiness, and their division between the sensory world and the intelligible world fit well with Judaeo-Christian notions of pollution and sin. The soul of man, Socrates had argued in the *Phaedo*, was invisible and indivisible, unlike everything material, and hence indestructible and immortal. The soul, Plato says,

is most like the divine, deathless, intelligible, uniform, indissoluble, always the same as itself, whereas the body is most like that which is human, mortal, multiform, unintelligible, soluble, and never consistently the same. (Plato 1997: 70; 80b)

Through his encounters with Platonists, described in Book 7 of his *Confessions* and Book 8 of the *City of God*, Augustine came to appreciate the existence and significance of incorporeal things – God and the soul (Augustine 1912, 1: 393ff.). He decided that materialism was a theory propounded for ideological reasons by persons addicted to pleasure, as he had once been, or at least propounded by persons who were biased by their love of objects perceived by the senses. He described them as philosophers "who have adopted a belief in the material elements of nature because their own minds are subservient to the body," initiating a long tradition of *ad hominem* attack on the classical atomists and their teachings (Augustine 1968, 3: 27). "These . . . philosophers . . . have been able to conceive only what their hearts, bound to their bodily senses, have devised for them" (*ibid.*). Even though they "had within them something which they did not see," they did not recognize it as such, and they believed erroneously that life can come from non-living things.

His new synthesis of theology and philosophy provided Augustine with the repose he longed for, freeing him from the pummeling he had received in his pursuit of love and experience. All corporeal beauty, he determined, was transitory and mutable: all

beautiful objects except God “rise, and set; . . . they grow up, that they may attain perfection, which, having attained, they wax old and wither” (Augustine 1912, 1: 175). He saw the underlying materialist fallacy exemplified in the idolatry of gentiles, who “changed the glory of thy incorruptible nature into idols, and divers shapes, into the likeness of the image of corruptible man, and birds, and beasts, and serpents” and even of “a calf which eateth hay” (Augustine 1912, 1: 369). Created things, he decided, had no “absolute being,” though they were not nothing either; they came from God but lacked the complete being of God (Augustine 1912, 2: 375). He came to understand that “the matter of the whole universe, its shapes, qualities, its regulated movements,” together with the life of animals, plants, and human beings, could have no existence “except as it comes from Him who is absolute being” (Augustine 1968, 3: 31). Evil, he decided further, was not real and consisted merely in the negation of the good, for everything created must be good.

Asceticism is central to most religions and characterizes most notions of holiness; Plato’s *Timaeus* is concerned with the state of holiness attainable by human beings, as is the New Testament of Christianity. Both sects – Platonists and Christians – demanded renunciation of worldly pleasures. Yet both sects also found it difficult or impossible to depict the condition of holiness except through erotic language and imagery, including the *Song of Solomon* in the Old Testament, the many references to brides and marriages in the New Testament, and the evocations of longing and fulfillment in the *Symposium*. There was a further internal tension in both sects between the ontological doctrine of the “good world” as expressed in Genesis and in the *Timaeus* and the moral injunction to transcend the world or to die to it, or simply not to care about it. If the world of creatures is good, why do we need to turn away from it rather than embracing it? If we are the creations of an omnipotent and supremely benevolent being, how can we be so fundamentally misled about value?

Augustine left these problems – versions of the age-old Problem of Evil – largely unresolved, though he drew, as I will show below, an implicit distinction between the natural world, which he regarded as essentially good, and the artificial world of human elaboration, which he regarded as vain and meretricious. He maintained that a form of happiness would reward those who submitted entirely to God’s commands that outshone the happiness that could be obtained from contemplation of the Creation, as fine as it was. But one cannot say these distinctions were sufficient to dissipate the paradox, and Augustine was not entirely averse to unresolved paradoxes. He was fascinated by philosophical oddities, such as the ruin of mankind through the mind of a woman and the salvation of mankind through the body of a woman (Augustine 1997: 14), and the Problem of Evil was one he returned to frequently in his writings (Macdonald 2001). At the end of his life, however, he expressed a disenchantment with all philosophy – even Platonic philosophy – in his *Recantations*. Faith alone was to be our guide, and scripture our only text.

Already in the process of his conversion, Augustine was much disheartened by the “wrangles of all those cavilling questions, whereof I had read so much amongst the Philosophers contradicting each other” (Augustine 1912: 283). Mankind, he decided “would prove too weak to find out the truth by way of evident reason, and for this case there was need of the authority of the Holy Writ” (Augustine 1912: 285). What had seemed to him “absurdities” when he had first looked into the Bible now appeared to

be deep mysteries, “and the authority of that Book appeared so much the more venerable, and so much the more worthy of our religious credit” (*ibid.*). Descartes responded very differently to the problem of contradictory voices in philosophy. He would not abandon reason, and he would not welcome mystery; rather, he would apply his human reason consistently, and this consistent application would not only prove to anyone’s satisfaction the existence of God without any need for reliance on faith – which Descartes thought could not be reasonably demanded of those who had not been brought up in a Christian culture – but the reliability of human reason itself. The immortality of the human soul, however, he admitted, was a matter for faith and could not be proved (2:291; AT 7:431).

Descartes’s autobiography shares some features with Augustine’s. In the *Discourse*, he presented himself as a body-in-motion, traveling about the world in the company of Prince Maurice, and even in later life he was an extraordinarily restless person who changed his dwelling-place frequently (Baillet 1691). Unlike Augustine, who became an enthusiastic adherent of one sect after another in his search for something to believe in, Descartes maintained a certain non-committal aloofness about philosophy in his youth. He liked mathematics, he tells us in the autobiographical sections of the *Discourse*, but he was not captivated by the rest of his education, certainly not by the natural philosophy of the Scholastic philosophers he read. At the conclusion of his formal studies, at the age when Augustine was making his way through the philosophical canon of his time, Descartes was studying music theory, physics, military engineering, and animal physiology (Baillet 1691). Where religion was concerned, Descartes had been born into a Christian culture, and he accepted Catholicism, but he lacked the fervor of a convert to a new religion. Though he assures the reader that he “revered theology,” and although he did come to feel himself specially favored by God, his *Meditations* does not resemble the conventional religious meditation in which the meditator is drawn into an “I-thou” relationship with a caring, loving, but also demanding divinity. And if Descartes experienced guilt and conflict over his enjoyment of sensory pleasures, he does not tell the reader about it. Renunciation is not a driving theme for him, as it is for Augustine.

As I will try to show later, Descartes took on the Problem of Evil, and succeeded very well in solving it, but at the price of dispensing with the distinction between the artificial and the natural that was meaningful to Augustine, and with the doctrine of individual salvation as well. Menn is surely right to suggest that Platonic-Augustinian problems about the ultimate value of corporeal things were of central concern for Descartes, but Gouhier was surely right to suggest that Augustinian theology, which represents one’s relationship to God as deeply personal and intimate, and its cultivation as more important than any earthly endeavor whatsoever, is very far from Descartes’s own theology.

Coincidence and Divergence

Above and beyond their common appeal to an indubitability argument – that doubt implies the existence of an understanding, willing subject – there are many points of overlap in Augustine and Descartes. Probably, Descartes had read Augustine in his

youth, or at least heard lectures on Augustinian metaphysics and theology, though no one has proved that this is so. Probably, Augustine's doctrines came back to him as he composed the *Meditations*, even if he had forgotten their source. Both philosophers (I have relegated many of their comparable statements to an appendix below) assert that:

- Our daily familiarity with sensory objects produces certain prejudices.
- It is essential to "withdraw" from sensory experience to gain knowledge, especially of oneself.
- Wrongly informed philosophers and naïve people believe the soul to be material.
- The soul can be known to be an incorporeal substance.
- The attribution of mentality to other creatures is inferential.
- We possess innately an idea of God that corresponds to God.
- The existence of sin and error must be reconciled with God's goodness.

To this list of common doctrines might be added the absolute dependency of created nature on God that Descartes enunciated in the Third Meditation, where he claimed that his existence was secured from moment to moment only by the will and action of God, on the grounds that "the same power and action are needed to preserve anything at each individual moment of its duration as would be required to create that thing anew if it were not yet in existence" (2:33; AT 7:49), and his notion that, as a created being, he stands midway between Nothingness – the absence of all perfection – and God – the absolutely perfect being – in the Fourth Meditation (2:38; AT 7:54). To be sure, there are marked differences in doctrine. As noted, Augustine identified the soul with a principle of vitality, and he ascribed not only life but also mentality – perception, recollection and memory, and intention – to animals (Augustine 2002: 83), as Descartes notoriously did not (1:335; AT 11:341–2). Above and beyond the substantive differences in their doctrines, there is also an important formal difference in the use to which the propositions just listed are put.

Augustine enunciated them over and over and elaborated them in various ways in his many works. They formed a philosophical picture that was generally coherent, though subject to the tensions described above. He expected his readers to ponder these points and their significance throughout their remaining lives. Nothing less than their salvation was at stake. Descartes, by contrast, emulated the procedure of the mathematicians. The *Meditations* approaches to the condition of a single lengthy, sustained, sequential argument. Descartes begins with a hypothesis he intends to overturn. The hypothesis is: "There exists an Evil Genius, a malevolent God, who deceives me about the existence of a material world and who has ensured that I know absolutely nothing." In the course of reducing this hypothesis to absurdity, he establishes various lemma-like propositions along the way, and he builds further on his results to show that there exists a unique and good God, and that he, Descartes, knows a great deal and can know a great deal more about the corporeal world.

Descartes did not consider the propositions listed above to represent the content of his philosophy, requiring articulation, rephrasing, expansion, and repetition in order to bring puzzled or skeptical auditors around to the correct view of humanity, God, and nature. He saw himself as having produced an argument that, if carefully followed, was

as apodictic and as economical as any good piece of mathematical reasoning. Beyond clearing up some confusions in the *Replies to Objections* that he published with the *Meditations*, Descartes saw no need to refine and explain his position further. Nor did he expect his readers to spend their future philosophical hours meditating upon the propositions above for the sake of their souls. Rather, Descartes intended his ideal reader to imitate his, Descartes's, own reasonings and to master the argument of the *Meditations* by reading it through carefully and with full attention once. Its conclusions mastered, the reader should turn his attention back to practical matters – and perhaps to the experimental science of bodies to which Descartes was himself devoted, and which constituted for him “philosophy.” He reportedly spoke as follows to Frans Burman in 1648, two years before his death:

A point to note is that one should not devote so much effort to the *Meditations* and to metaphysical questions, or give them elaborate treatment in commentaries and the like. Still less should one try to do what some try to do, and dig more deeply into these questions than the author did; he has dealt with them quite deeply enough. It is sufficient to have grasped them in a general way, and then to remember the conclusion. Otherwise, they draw the mind too far away from physical and observable things, and make it unfit to study them. Yet it is just these physical studies that it would be most desirable for people to pursue, since they would yield abundant benefits for life. (3:346–7; AT 5:165)

Writing at the dawn of the Scientific Revolution, inspired by the Baconian program of increasing wealth and improving health in human beings through an understanding of natural processes, Descartes was deeply committed to the expansion and revision of ancient physics, medicine, and morals – morality consisting in his view as a kind of *medicina mentis* – a practical theory of mental health. He revived the conception of matter as composed of subvisible corpuscles with no properties except shape, size, and motion, without admitting the existence of indivisible particles – true atoms – or void that had been rejected by Plato, Aristotle, and Augustine, and he made it the basis of his cosmology, physics, and physiology. His Galilean inquiries into cosmology and the physics of inanimate bodies, which he surveyed in his early unpublished treatise *The World* and later in the *Principles of Philosophy*, were supplemented by his investigations of the animal machine. These were first reported in his posthumously published *Treatise of Man* completed around 1628–9. They are also the principal focus of the Parts V and VI of the *Discourse on Method* and of the Sixth Meditation. Whereas Augustine maintained firmly against the Epicureans that life could not arise from non-living matter, Descartes maintained, in effect, that “life” was the name given to the phenomena of machines that men had not constructed, but that had come into being as a result of time and chance (1:329–30; AT 11:330–1; cf. 1:257; AT 8A:101). Since life was mechanism, the amelioration of life implied nothing more difficult or mysterious than the improvement of any machine, except that the machines of nature were composed of more parts and were more complex than the machines of men.

The conclusion Descartes reached in the Sixth Meditation and that he hoped his readers would take note of was not just the incorporeal nature of the thinking soul, but the dependence of all our experiences and emotions upon the body, and especially upon its nervous system. Referring to “the law that obliges us to procure, as much as is in

our power, the common good of all men,” Descartes had said in the *Discourse* that his train of reflections

made me see that it is possible to arrive at knowledge that would be useful in life and that, in place of that speculative philosophy taught in the schools, it is possible to find a practical philosophy, by means of which, knowing the force and the action of fire, water, air, the stars, the heavens, and all the other bodies that surround us, we might be able, in the same way, to use them for all the purposes for which they are appropriate, and thus render ourselves, as it were, masters, and possessors of nature. (1:142–3; AT 6:61–2)

The ambition to revive ancient science and improve it, with an eye to controlling the processes of nature, was foreign to Augustine. This was not because Augustine lived in a pre-scientific era, but because he set little store by the science of the pagans – Graeco-Egyptian learning in mathematics, astronomy, mechanics, logic, practical chemistry, and medicine. Though he did not absolutely condemn these studies, as he did the magical arts of divination and all commerce with demons for the discovery of esoteric secrets, and although he even recommended the compilation of an encyclopedia of natural history, he thought that they lacked the intrinsic worthwhileness of the care of one’s incorporeal soul:

As for the other branches of learning found in pagan society, apart from the study of things past or present which concern the bodily senses (including the productions and experimentations of the practical arts) and the sciences of logic and number, I consider nothing useful here. In all these subjects the watchword must be, nothing in excess, and nowhere more so than in those which concern the bodily sense and are subject to time or restricted in space. (Augustine 1997: 63–4)

For Augustine, the contrast between the ungrateful and perishable things of the visible world and the invisible things of God presented itself with increasing starkness, as he realized the folly of his early attachment to corporeal things: “What shall I say, when as sitting in mine own house, a lizard catching flies, or a spider entangling them in her nets, oftentimes makes me attentive to them. . . . One thing it is to get up quickly and another thing not to fall at all. And of such toys my life is full; and my only hope is thy wonderful great mercy” (Augustine 1912, 2: 181). Curiosity was for Augustine a “disease,” related to the sin of concupiscence. “Curiosity for trial’s sake pries into objects . . . merely out of an itch of gaining the knowledge and experience of them. . . . Hence also men proceed to investigate some concealed powers of that nature which is not beyond our ken, which it does them no good to know, and yet men desire to know for the sake of knowing” (Augustine 1912, 2: 177).

An appreciation of Descartes’s ambitions with respect to practical philosophy, as opposed to the metaphysics he discussed in Meditations I–V and the first half of Meditation VI, helps to make clear both the text-internal parallels between them and Descartes’s sense that Augustine would prove a useful ally. First, the existence of a God upon whom all of nature depended for its continued existence, and upon whom all the regularities captured in the laws of nature depended, and of an incorporeal human soul, which Descartes claimed to have demonstrated, provided a wide metaphysical framework in which corporeal nature was not “all there is.” By rejecting atheism and by

dissociating his theory of the soul from that of the materialists who considered it to be something vaporous, or fiery, or simply atomic, Descartes gave due weight, as it were, to incorporeals. The *Meditations* appeared to some of Descartes's contemporaries rather aberrant in the context of his work as a whole, sandwiched in as it was between the pre-*Meditations Essays* on *Optics*, *Meteorology*, and *Geometry* and his suppressed treatises on cosmology and on animals, and the post-*Meditations Principles*. Though the *Meditations* was a small work, it presented corporeal nature as small in relation to God, and natural philosophy as unthreatening to theology.

When Descartes dismissed sensory qualities such as color and odor as “confused” products of mind-body interaction in the Third Meditation (2:30; AT 7:43) and denied them the status they had held in Aristotelian ontology, he seemed to echo the Platonic position that the world of experience is an image of something more real, or even a kind of illusion. But it is important to remember that matter – extended substance – is perfectly real for Descartes and that it completely determines the character of our sensory experience via the action of minute material corpuscles and the subtle structures they compose. Further, by reserving a role for incorporeal substances, Descartes could neatly segregate the parts of his philosophical program that were likely to be successful – the explanation of phenomena such as growth, digestion, and generation – from the parts that did not lend themselves to corpuscularian explanation – the origins of thought, especially abstract and mathematical thought, and consciousness, intentionality, and language. The doctrine of the incorporeality of the soul, understood as a thinking principle, not as a principle of vitality, left him the option of studying the phenomena of life – including sensation and emotion, and the experience of volition or agency – by experimental means.

Living in the Netherlands, Descartes was safe from the fate of Galileo. He had, however, aroused the ire of the Protestant establishment at the University of Utrecht. By defending himself against accusations that he had borrowed from Augustine without giving him credit, yet welcoming perceptions of the confluence of their doctrines, Descartes could represent natural science and his own interest in it as theologically innocuous. Curiosity about corporeal nature need not imply nature-worship, the “idolatry” that alarmed theologians. The neo-Epicurean ontology he was advancing in place of Aristotle’s hylomorphism did not necessarily imply the mortality of the soul. His ally Mersenne approved of this strategy, observing that “The authority of St. Augustine will at least prevent that Calvinist theologian [Voetius] from denouncing the new philosophy as an atheism and a danger to religion” (Gouhier 1978: 31).

The Good World Doctrine

A common element in Augustinian and Cartesian philosophy, as noted earlier, is the Christian-Platonic doctrine that the Creation is essentially good. Thus Augustine:

And Thou, O God, sawest everything that thou hadst made, and behold it was very good: because we also have seen the same, and lo, everything is very good. (Augustine 1912: 455)

Thanks to thee, O Lord. We behold the Heaven and the Earth, be it either the corporeal part, superior or inferior; or the spiritual and corporeal creation: . . . We behold the luminaries shining from above. . . . We behold on all sides a moist element, teeming with fishes, beasts, and birds: . . . We behold the face of the earth decked up with earthly creatures, and Man created after thine own image and likeness, even through that very Image and likeness (that is the power of reason and understanding) made superior to all unreasonable creatures. (Augustine 1912, 2: 465)

Yet Augustine calls for his readers to imitate him in what Menn calls his method of “aversion,” turning away from the distractions and delights of the sensory world to permanent and unchangeable good and contemplation of God. In his *Symposium*, Plato described a process of ascent, by which we climb up a ladder, from the appreciation of the beauty of individual corporeal things on the lowest rung, to the appreciation of beautiful corporeal things in general, to the appreciation of beautiful incorporeals, first ideas, then Forms, including “the beautiful itself, absolute, pure, unmixed, not polluted by human flesh or colours or any other great nonsense of mortality” (Plato 1997, 211e: 494). Awareness of the beauty of creatures as Augustine responds to and expresses it is a stage on the way to the Christian equivalent: the “beatific vision” that, according to medieval theologians, we can anticipate in this life, but will experience only in Heaven when we meet God face to face. Augustine fled from human artifice – represented for him by stage-plays, conjurors and magicians, and women with painted faces and dyed hair – but he discovered and describes at the close of his *Confessions* the beauty of nature as it issued directly from the hand of God, and even the beauty of unadorned woman, who “in the mind of her reasonable understanding,” had “a parity of nature” with his own (Augustine 1912: 465).

Descartes never waxed rhapsodic about visible nature. He seems not to have been particularly sensitive to landscapes, or to birds and animals in their native elements, evidently preferring the latter on the dissecting table. He did however assert that the created world investigated by physics and metaphysics expressed God’s benevolence and power. He maintained that, as a product of God’s workmanship, he had been made good a being as he could be made, and that the perfecting of his capacities, through the expansion of his knowledge and the disciplining of his will, was up to him. He provided explanations for epistemological and moral failure that made no reference to Original Sin, presenting the liability to error as an unfortunate side-effect of an overall beneficent dispensation (Wilson 2003: 102, 215ff.):

I cannot deny that there may in some way be more perfection in the universe as a whole because some of its parts are not immune from error, while others are immune, than there would be if all the parts were exactly alike. And I have no right to complain that the role God wished me to undertake in the world is not the principal one or the most perfect of all. (2:42–3; AT 7:61)

And experience shows that the sensations which nature has given us are [most frequently conducive to the preservation of the healthy man]; and so there is absolutely nothing to be found in them that does not bear witness to the power and goodness of God. (2:60; AT 7:87)

Descartes's writings nevertheless often seem to be characterized by the same internal tension that Augustine displays between the good world doctrine and the need for "aversion." Descartes advises us in the *Meditations* that incorporeal things are "better known" than corporeal things and that corporeal things are better known by the intellect than by the senses (2:20ff.; AT 7:30ff.). "As for . . . light and colours, sounds, smells, tastes, heat and cold, and the other tactile qualities," the Meditator confesses, "I think of these only in a very confused and obscure way, to the extent that I do not even know whether they are true or false, that is, whether the ideas I have of them are ideas of real things or of non-things" (2:30; AT 7:43). Sensory properties fluctuate, and attributions of them are unstable, as Descartes noted in considering a piece of wax (2:20ff.; AT 7:30ff.).

In the Cartesian system, however, there is no suggestion that the excellence of Creation, considered under its corporeal aspect, points beyond itself or indicates the excellence of a life in some future condition in another world. Indeed, the incorporeal soul, which cannot, according to the account given in the Sixth Meditation, perceive, remember, imagine, or feel, is hardly a fit candidate for life in Heaven or Hell. Our purpose on Earth is to extend our knowledge as far as possible and to use it for human good, and the intense curiosity of the student of the magnet, the rainbow, snow, and animal physiology in all its colorful, pulsating complexity is not only commendable because it may bring useful results, but in accord with our God-given nature. One of the marks of his workmanship an omniscient God has left upon our souls is our striving for continuous improvement in our empirical knowledge.

In the Sixth Meditation, Descartes completed his demonstration of the incorporeality of the soul, not just in thought, but in actuality. But his intention was not to draw men away from their concern with corporeal things. On the contrary, it was to show them what a science of corporeal nature could accomplish, once soul-body relations and the genesis of our experiences were properly understood. The ethical importance of the animal machine doctrine is barely hinted at in the *Meditations*, but it is developed in the *Passions of the Soul*. In Descartes's view, ethics is the science of managing our emotions, as the old Stoic philosophers maintained. Contrary to what the Stoics thought, however, the emotions, as created by God, are generally beneficial to us, like the rest of our conscious experiences, and only excessive or socially harmful emotions need to be suppressed. Self-control and control of our appetites is necessary, not in light of Original Sin or to gain our reward in Heaven and avoid the torments of Hell, but simply because we are animal machines whose output is complex and sometimes undesirable when we act on emotional prompts or make hasty judgments. Since cultivating a general condition of *ataraxia* or perfect tranquility would be, in effect, impious, the key is to use one's will, as one does in epistemological contexts, selectively. We often cannot control the flow of spirits through the brain and nerves directly and so cannot vanquish emotions, which are the conscious awareness of these physiological changes. But we can often regulate our physiological responses by generating thoughts and ideas (1:343ff.; AT 11:359ff.).

Augustine found that philosophical ideas detached him from his involvement with corporeal things and that thoughts about God enabled him to find and stay on the right moral track. Descartes could claim to have explained why thinking and imagining were effective in combating undesirable drives and emotions. It was, however, an implica-

tion of his account that the generation of ideas and images would be effective against drives and emotions, whether or not the ideas were true and the images were accurate. Ideas about God, for example, might be morally efficacious whether or not God existed. Cartesian ethics was thus separated twice over from the ethical divine command theory of Augustine. It was prudential, like pagan ethical theory, and it made essential reference to ideas, not Beings or future states of affairs. While Augustine's ethical system was intended to promote "a life of true happiness," and while certain fundamental ethical concepts such as kindness and wrongdoing actually constrained, he thought, our interpretation of scripture (Augustine 1997: 80), a knowledge of God's will was indispensable in ethics. Fear of God's wrath and his punishing capabilities provided motivation to learn his will (Augustine 1997: 33).

Both Descartes's relative indifference to faith, and his insistence that we should submit all our beliefs to rigorous testing for their intellectual clarity and not accept any propositions without proper and personal warrant, were initially perceived by Arnauld as contrary to Augustinian doctrine. Arnauld insisted that Descartes should make clear that "when he says we should only assent to what we clearly and distinctly perceive he is talking only about the sciences and intellectual contemplation, not matters belonging to faith and conduct; the prudent beliefs of the faithful are not subject to this test." Augustine, Arnauld commented, had warned that "[A]bsolutely nothing in human society will be safe if we decide to believe only what can be regarded as having been clearly perceived" (2:151–2; AT 7:216–17). Arnauld in turn expressed concern that the atheists of his age might well try to "distort" Descartes's words to subvert religion. Descartes replied blandly that the entire context of his book made it clear that "when I asserted that 'we should assent only to what we clearly know' this was always subject to the exception of 'matters which belong to faith and the conduct of life'" (2:172; AT 7:248).

Descartes has been described as having married Platonic metaphysics to Democritean physics (Wundt 1914: 161), and this judgment should by now seem very apt. The Platonic-Christian-Democritean system of Descartes would have been impossible to construct if Augustine – or someone like him – had not first synthesized Christianity with Platonism. And the resulting mixture of three terms was a potent combination that, for a time, had considerable force against the Aristotelian metaphysical physics that still dominated the natural philosophy curriculum in the first half of the seventeenth century. Aristotle's philosophy could be attacked as unchristian at the same time as his physics could be shown to be obscure and of no practical use. Plato's ridiculous physics and the atomist's scandalous moral-theological doctrines could be overlooked, since their corresponding virtues compensated for these defects, when the best parts of each were selected and combined.

Augustine is, in this respect, responsible for some key elements of what we designate as seventeenth-century "rationalism" and that we identify especially with Descartes. Over the long term, however, the marriage of Plato and Democritus was not very stable; metaphysics split off from physics, and Cartesian rationalism fell into disrepute. The "empiricism" with which rationalism is typically contrasted is characterized by its skepticism with regard to incorporeal substances and by its general disregard for asceticism and for the method of "aversion." John Locke, for example, who eclipsed Descartes in popularity in the eighteenth century, exemplified both tendencies. Yet the esteem

with which we regard Descartes, as the author of a beautifully constructed philosophical system, can survive the realization that his views about God, the soul, and the world are not true and indubitable and that his physics and physiology, though historically influential, did not have the certainty he claimed for them.

Appendix: Passages Relating to Shared Doctrines in Augustine and Descartes

- (1) Our daily familiarity with corporeal objects produces certain prejudices.

How the mind may seek and find itself is, therefore, a remarkable question: . . . [W]hat is so much in the mind as the mind? But because it is in those things of which it thinks with love, and it has grown accustomed to thinking of sensible things, that is, of bodies, with love, it is incapable of being in itself without the images of those things. (Augustine 2002: 52–31)

[O]ur familiarity with bodies has become so great, and our thought has projected itself outwardly with so wonderful a proclivity towards these bodies, that when it has been withdrawn from the uncertain realm of bodies and fixed its attention on the much more certain and more stable knowledge of the spirit, it again takes refuge in these bodies and seeks rest there from the place where it drew its weakness. (Augustine 2002: 61)

The first and main cause of all our errors may be recognized. In our early childhood the mind was so closely tied to the body that it had no leisure for any thoughts except those by means of which it had sensory awareness of what was happening to the body. (1:218; AT 8A:35)

Some years ago I was struck by the large number of falsehoods that I had accepted as true in my childhood, and by the highly doubtful nature of the whole edifice that I had subsequently based on them. . . . Whatever I have up till now accepted as most true I have acquired either from the senses or through the senses. (2:12; AT 7:17–18)

- (2) It is necessary to “withdraw” from sensory experience to gain knowledge, especially of oneself.

When [the mind] is . . . commanded to know itself, it should not seek itself as though it were to be withdrawn from itself, but it should rather withdraw from what it has added to itself. For it is more deeply within, not only than those sensible things which are evidently without, but even than those images which are in some part of the soul even beasts have. (Augustine 2002: 53)

I will now shut my eyes, stop my ears, and withdraw all my senses. I will eliminate from my thoughts all images of bodily things, or rather, since this is hardly possible, I will regard all such images as vacuous, false and worthless. I will converse with myself and scrutinize myself a little more deeply; and in this way I will attempt to achieve, little by little, a more intimate knowledge of myself. (2:24; AT 7:34)

(3) Wrongly informed philosophers and naïve people believe the soul to be material.

[S]ome thought [the soul] to be the blood, others the brain, others the heart. . . . Others believe that it consisted of very minute and indivisible bodies called “atoms,” which meet and cling together. Others said that its substance was air, others fire. Others could not think of any substance except as a body, and since they found that the soul was not a body, they said that it was not a substance at all, but the harmony itself of our body. . . . And, consequently, all these have regarded the soul as mortal; for, whether it were a body or some arrangement of the body, in either case it could certainly not live forever. (Augustine 2002: 51)

[T]he first thought to come to mind was that I had a face, hands, arms and the whole mechanical structure of limbs which can be seen in a corpse, and which I called the body. The next thought was that I was nourished, that I moved about, and that I engaged in sense-perception and thinking; and these actions I attributed to the soul. But as to the nature of this soul, either I did not think about this or else I imagined it to be something tenuous, like a wind or fire or ether, which permeated my more solid parts. (2:17; AT 7:26)

(4) The soul can be known to be an incorporeal substance.

Whoever sees in all these opinions that the nature of the mind is a substance, and certainly not a corporeal one, that is, it does not occupy a less extension of place with a less part of itself, and a greater with a greater part, ought to see at the same time that those who regard the mind as a corporeal substance do not go astray because their mind is lacking in knowledge, but because they add those things without which they are unable to conceive of any nature. (Augustine 2002: 52)

And we, simply rational souls, are not perceptible by the senses, that is, we are not bodies but intelligible beings, since we are life. (Augustine 2002: 61)

I thus realize that none of the things that the imagination enables me to grasp is at all relevant to this knowledge of myself which I possess, and that the mind must therefore be most carefully diverted from such things if it is to perceive its own nature as distinctly as possible. (2:19; AT 7:28)

I think that a stone is a substance, or is a thing capable of existing independently, and I also think that I am a substance. . . . I conceive of myself as a thing that thinks and is not extended, whereas I conceive of the stone as a thing that is extended and does not think, so that the two conceptions differ enormously; but they seem to agree with respect to the classification ‘substance’. . . . I have the idea of substance in me in virtue of the fact that I am a substance. (2:30–1; AT 7:44–5)

(5) The attribution of mentality to other creatures is inferential.

[W]e . . . recognize, from a likeness to us, the movements of bodies by which we perceive that others besides us live. . . . [I]ndeed the beasts perceive as living, not only themselves, but also each other and one another, and us as well. Nor do they see our souls except through the movements of our bodies. . . . Therefore, we know the mind of anyone at all from our own; and from our own case we believe in that which we do not know. (Augustine 2002: 14)

[I]f I look out of the window and see men crossing the square, as I just happen to have done, I normally say that I see the men themselves, just as I say that I see the wax. Yet do I see any more than hats and coats which could conceal automatons? I judge that they are men. And so something which I thought I was seeing with my eyes is in fact grasped solely by the faculty of judgement which is in my mind. (2:21; AT 7:32)

(6) We possess innately an idea or image of God that corresponds to God.

[W]e too as a matter of fact recognize in ourselves an image of God, that is, of the most high Trinity, even if the image is not equal to him in worth, but rather very far short of being so. This image is not co-eternal and . . . it is not formed of the same substance as God. Yet it is nearer to him in the scale of nature than any other thing created by him. (Augustine 1968, 3: 531)

Some of [my] thoughts are like images of things . . . as when I think of a man, or a chimera, or the sky, or an angel, or God. (2:25; AT 7:37)

[T]he idea that gives me my understanding of a supreme God, eternal, infinite, [immutable,] omniscient, omnipotent and the creator of all things that exist apart from him, certainly has in it more objective reality than the ideas that represent finite substances. (2:28; AT 7:40)

(7) The existence of sin and error must be reconciled with God's goodness.

Who made me? Did not my God, who is not only good, but Goodness itself? Whence then came it that I can will both evil and will good? . . . Who was it that set this in me, that ingrafted into my stem this scion of bitterness seeing I was wholly made up by my most sweet God? If the Devil were the author, whence is that same Devil? (Augustine 1912, 1: 343)

When I attend to the nature of God, it seems impossible that he would have placed in me a faculty that is not perfect in its kind. (2:38; AT 7:55)

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Chapter 4

Descartes and the Legacy of Ancient Skepticism

CASEY PERIN

Introduction

In the sixteenth and seventeenth centuries there was an intense interest among philosophers, scientists, and theologians in the arguments of ancient skepticism. Both Cicero's *Academica*, the principal source for the Academic skepticism of Arcesilaus and Carneades, and Augustine's *Contra Academicos* had long been available in the Latin West. In 1562 Henri Estienne published a Latin translation of Sextus Empiricus' *Outlines of Pyrrhonism*, a complete exposition from the third century CE of Pyrrhonian skepticism. (For details about the rediscovery of ancient skepticism and its impact on early modern philosophy, see Popkin 1979, Schmitt 1972, Schmitt 1983, Larmore 1998, and Floride 2002.) Descartes himself thought that the skeptical arguments he presents, and claims to refute, in the *Meditations on First Philosophy* are no different from the arguments of the ancient skeptics. In response to Hobbes's complaint that the First Meditation is a rehash of ancient material, Descartes insists that "I was not trying to sell them [the arguments for doubting] as novelties" (2:121; AT 7:171). In a passage from the Second Replies Descartes explains that "Although I had seen many ancient writings by the Academics and the Skeptics on the subject, and was reluctant to reheat and serve this stale cabbage, I could not avoid devoting one whole Meditation to it" (2:94, trans. alt.; AT 7:130). And in a letter of April or May 1638 Descartes writes that "Although the Pyrrhonists reached no certain conclusions from their doubts, it does not follow that no one can." (3:99; AT 2:38–9). He then suggests that the Pyrrhonists' doubts can be used to prove the existence of God. The skeptical arguments of the First Meditation are part of Descartes's method, the method of doubt, for identifying a small set of certainties (including the existence of God) that are to serve as the metaphysical foundations of science. Descartes's suggestion here is that what is new in his method are *not* the skeptical arguments themselves – for they are just the arguments of the ancient skeptics – but the use to which he puts these arguments. And so in *Comments on a Certain Broadsheet* Descartes writes in reference to the skeptical arguments of the First Meditation that "I was not the first to discover such doubts: the skeptics have long been harping on this theme" (1:309; AT 8B:36–7).

There is, however, one difference between the arguments of the ancient skeptics and the skeptical arguments of the First Meditation. The ancient skeptics offered arguments

that, in different ways, were designed to generate *reasons for suspending judgment*. That is why Arcesilaus and other early Academics were commonly called “those who suspend judgment about everything” (οἱ περὶ πάντων ἐπέχοντες), and the standard Pyrrhonian skeptical arguments are presented by Sextus Empiricus as “modes of suspension of judgment” (τρόποι τῆς ἐποχῆς), that is, ways for the Pyrrhonian skeptic to bring herself or someone else to suspend judgment. A reason for me to suspend judgment about a proposition *p* is a reason for me to withhold assent both from *p* and from its negation (or from any proposition I recognize as entailing *p* or its negation). Descartes, in contrast, uses the skeptical arguments of the First Meditation to generate *reasons for doubt* (*rationes dubitandi*). A reason for me to doubt *p* is a reason for me to be less than certain that *p*. Defined in this way, a reason for doubt can but need not be a reason for suspending judgment. For it is possible for me to have a reason to doubt *p*, and so a reason to be less than certain that *p*, and nonetheless to have enough evidence for the truth of *p* to believe that *p* and to be justified in doing so. I know, for instance, that occasionally cars do not start in extreme cold. The fact that it is now extremely cold is, therefore, a reason for me to doubt that my car will start. But if I also know that in the past my car has always or usually started even in extreme cold, then I have enough evidence that my car will start to believe that it will start and to be justified in doing so. In this case my having a reason to doubt that my car will start just means that I am not certain that my car will start. Given my past experience with my car in extreme cold, my reason to doubt that my car will start is not a reason for me to suspend judgment about whether it will start.

Here I want to take up two questions raised by the distinction between reasons for suspending judgment and reasons for doubt. First: is Descartes right in thinking that the skeptical arguments of the First Meditation are no different from the arguments of the ancient skeptics? Is Descartes right in thinking, more specifically, that the way in which the skeptical arguments of the First Meditation generate reasons for doubt is no different from the way in which the arguments of the ancient skeptics generate what those skeptics, at least, regarded as reasons for suspending judgment? Second: does Descartes think that the reasons for doubt generated by the skeptical arguments of the First Meditation constitute *by themselves* reasons for suspending judgment about (for example) whether I have hands or whether $2 + 3 = 5$?

The Structure of Skeptical Arguments

In the First Meditation Descartes, in the guise of the meditator, is seeking reasons to doubt the truth of as many of his beliefs as possible. He thinks that he has acquired most of his beliefs “either from the senses or through the senses” (2:12; AT 7:18), and he recognizes at once that the fact that the senses deceive him in some circumstances – when, for instance, an object is very small or far away – is not a reason to doubt the truth of any belief he forms on the basis of the senses in other and more favorable circumstances. For, the meditator explains,

there are many beliefs about which doubt is quite impossible, even though they are derived from the senses – for example, that I am here, sitting by the fire, wearing a winter dressing

gown, holding this piece of paper in my hands, and so on. Again, how could it be denied that these hands or this whole body are mine? (2:13; AT 7:18).

But he then considers the possibility that these beliefs have been produced in just the way (whatever that is) the false beliefs of madmen are produced. The meditator dismisses this possibility only to consider next the possibility that he is now dreaming and that his beliefs that he is sitting by the fire, etc. have been produced in just the way (whatever that is) dreams are produced. Since at this point in the *Meditations* he claims to “see plainly that there are never any sure signs by means of which being awake can be distinguished from being asleep” (2:13; AT 7:19), the meditator concludes that now at least he cannot eliminate the possibility that he is dreaming. He takes *this* fact to be a reason to doubt the truth of all his beliefs about bodies. But the meditator does not regard the fact that now at least he cannot eliminate the possibility that he is dreaming as a reason to doubt the truth of his mathematical beliefs: “For whether I am awake or asleep, two and three added together are five, and a square has no more than four sides. It seems impossible that such transparent truths should incur any suspicion of being false” (2:14; AT 7:20). Yet the meditator has long held the belief that he is the creation of an omnipotent God, and this belief now leads him to consider a new possibility:

How do I know that he [an omnipotent God] has not brought it about that there is no earth, no sky, no extended thing, no shape, no size, no place, while at the same time ensuring that all these things appear to me to exist just as they do now? What is more, since I sometimes believe that others go astray in cases where they think they have the most perfect knowledge, may not I similarly go wrong every time I add two and three or count the sides of a square, or in some even simpler matter, if that is imaginable? (2:14; AT 7:21)

The fact that now at least he cannot eliminate the possibility that *all* of his beliefs, including those beliefs whose truth seems completely evident to him, have been produced by an omnipotent God intent on deceiving him seems to the meditator to be a reason to doubt the truth of any belief he now has.

The principal skeptical arguments of the First Meditation – and by that I mean the dream argument and the deceiving God argument – are *skeptical scenarios* (Curley 1978: 86–89, Broughton 2002: 64–67). A skeptical scenario is a story about how I have acquired some or all of my beliefs according to which those beliefs are false or defective in some other way. A skeptical scenario constitutes a reason for doubt only if it satisfies both an explanatory and an epistemic requirement. For it must explain how I have acquired the beliefs which fall within its scope despite the fact that these beliefs are false or defective in some other way. And it must be the case that I cannot eliminate the possibility that I have acquired these beliefs in the way described by the skeptical scenario. Now two types of skeptical scenario can constitute a reason for doubt. A skeptical scenario of the first type is such that if I have acquired a belief in the way described by the scenario, then my belief is false. Call a skeptical scenario of this type a *false belief scenario*. A skeptical scenario of the second type is such that if I have acquired a belief in the way described by the scenario, it does *not* follow from this fact alone that my belief is false. It *does* follow that my belief is defective to the extent that it has a

deviant causal history, but it is possible for a belief with this deviant causal history to be true. Call a skeptical scenario of this type a *deviant causal history scenario*.

A skeptical scenario of either type constitutes a reason for doubt, if it does, because it introduces an uneliminated, and perhaps ineliminable, possibility that the beliefs which fall within its scope are false. This is obviously the case with a false belief scenario. For the possibility that I have acquired a belief in the way described by a false belief scenario is just the possibility that that belief is false. But if I cannot eliminate the possibility with respect to a belief of mine that it is false, then I have a reason to doubt – where, at a minimum, that is a reason to be less than certain of – the truth of that belief. Suppose I believe (as, in fact, I do) that I have hands. The possibility that I have acquired this belief as a result of the machinations of an omnipotent and deceptive God is just the possibility that my belief that I have hands is false. If I cannot eliminate this possibility, then I have a reason to doubt – where, at a minimum, that is a reason to be less than certain of – the truth of my belief that I have hands.

It is worth noting that Descartes presents the dream argument as well as the deceiving God argument as a false belief scenario. If I am dreaming that *p* and believe that *p* because I am dreaming that *p*, it does not follow, and Descartes does not think it follows, that my belief that *p* is false. But Descartes thinks that in the past he has dreamed that *p* and believed that *p* because he was dreaming that *p*, and his belief that *p* was false. “How often, asleep at night, am I convinced of just such familiar events – that I am here in my dressing-gown, sitting by the fire – when in fact I am lying undressed in bed!” (2:13; AT 7:19). The possibility Descartes, in the guise of the meditator, considers here and claims he cannot eliminate is not just the possibility that he is dreaming that he is wearing a dressing gown and sitting by the fire, but that he is dreaming that these things are so when in fact they are not. So in the First Meditation the dream argument involves the scenario in which I believe that *p* because I am now dreaming that *p* when in fact it is false that *p*. Moreover, in the context of the method of doubt Descartes consistently presents the possibility that he is dreaming as the possibility that he is dreaming that *p* when it is false that *p*. In Part Four of the *Discourse on the Method* Descartes writes that “considering that the very thoughts we have when awake occur while we sleep without any of them being at that time true, I resolved to pretend that all the things that had ever entered my mind were no more than the illusions of dreams” (1:127; AT 6:32). In the *Search for Truth* Eudoxus, Descartes’s mouthpiece, asks: “How can you be certain that your life is not a continuous dream, and that everything you think you learn from the senses is not false now, just as much as when you are asleep?” (2:408; AT 10:511–12). And, finally, in Part One of the *Principles of Philosophy* Descartes’s second reason for doubting beliefs acquired on the basis of the senses “is that in our sleep we regularly seem to have sensory perception of, or to imagine, countless things which do not exist anywhere” (1:194; AT 8A:6).

A deviant causal history scenario, too, introduces the possibility that the beliefs which fall within its scope are false, though it does so more obliquely than a false belief scenario. To see this recall that if I have acquired a belief in the way described by a deviant causal history scenario, then it does *not* follow from this fact alone that my belief is false. In this respect a deviant causal history scenario is different from a false belief scenario. But at the same time – and this is the important point – if I have acquired a belief in the way described by a deviant causal history scenario, then it does *not* follow

from this fact alone that my belief is true. If I have acquired a belief in the way described by a deviant causal history scenario and that belief is true, it is true only by accident. So the possibility that I have acquired a belief in the way described by a deviant causal history scenario is just the possibility that I have acquired that belief in a way that is compatible with its being false. This possibility, in turn, introduces the possibility that my belief is false. That is why if I have not eliminated the possibility that I acquired a belief in the way described by a deviant causal history scenario, I have a reason to doubt the truth of that belief.

Suppose that unlike Descartes we treat the dream argument as a deviant causal history scenario. Suppose, further, that I believe that I am holding a piece of paper in my hands. If I am now dreaming, it does not follow that my belief is false. For I might be dreaming that I am holding a piece of paper in my hands while I am in fact holding a piece of paper in my hands. But if I am now dreaming, then I have not acquired my belief in the way I think I have acquired it. For I think I have acquired my belief because I see and feel the paper in my hands. But if I am now dreaming, then I do not see or feel anything. Moreover, I think that *if* I have acquired the belief that I am holding a piece of paper in my hands because I now see and feel the paper in my hands, then it is not an accident that my belief is true. For it follows from the fact that I now see and feel the paper in my hands (and do not merely seem to see and feel it) that my belief that I am holding a piece of paper in my hands is true. The possibility that I am now dreaming is the possibility that I have acquired my belief in a way which, unlike seeing and feeling the paper in my hands, does not entail its truth. So the possibility that I am dreaming is in the first instance the possibility that I have acquired my belief in a way that is compatible with its being false. That possibility, in turn, introduces the possibility that my belief is false. That is why if I have not eliminated the possibility that I am now dreaming, then I have a reason to doubt the truth of my belief that I am holding a piece of paper in my hands.

Consider, in this connection, the following kind of case. Suppose as a member of a jury I believe, on the basis of the testimony of someone I take to be a reliable witness, that the suspect was in Cincinnati on the night of the murder. The defense attorney then introduces the possibility that the witness is unreliable, at least about this matter, and on reflection I find I cannot eliminate this possibility. Now if the witness is in fact unreliable, it does not follow that my belief that the suspect was in Cincinnati on the night of the murder is false. Sometimes an unreliable witness provides true testimony on a matter about which he is unreliable. But if the witness is unreliable about the matter, if I believe that the suspect was in Cincinnati on the night of the murder solely on the basis of the testimony of this unreliable witness, and if my belief is true, then it is true only by accident. The possibility that the witness is unreliable is in the first instance not the possibility that my belief is false, but the possibility that my belief, being based on the testimony of an unreliable witness, has been acquired by me in a way that is compatible with its being false. *This* possibility, in turn, introduces the possibility that my belief is false. That is why if I cannot eliminate the possibility that the witness is unreliable, then I have a reason to doubt the truth of my belief that the suspect was in Cincinnati on the night of the murder.

To sum up this part of the discussion. A skeptical scenario constitutes a reason for doubt, if it does, because it introduces the possibility that the beliefs which fall within

its scope are false. A deviant causal history scenario introduces this possibility less directly, and so less perspicuously, than a false belief scenario. If Descartes recognized this fact, it provided him with a reason to present the dream argument as a false belief scenario rather than a deviant causal history scenario.

The Arguments of the Ancient Skeptics

The arguments of the ancient skeptics did *not* take the form of either kind of skeptical scenario. The Stoics claimed that knowing, rather than merely believing, something about the world was a matter of assenting to a particular kind of perceptual experience they called a “cognitive impression” (καταληπτική φαντασία). The Stoics were also committed to the principle that a person ought to assent only to cognitive impressions. Call this principle *the Stoic maxim for assent*. The Academics, beginning with Arcesilaus and continuing to the end of the skeptical Academy in the first century BCE, challenged the Stoic claim that at least some perceptual impressions are cognitive impressions. The Academics presented several arguments for *the indiscernibility thesis*. This is the thesis that every true impression is such that some false impression just like it is possible. (For the indiscernibility thesis, see Cicero, *Academica* 2.40–1, 2.77–8, 2.83; Sextus Empiricus, *Adversus mathematicos* 7.154.) The Stoics themselves conceded that *if* every true impression is such that some false impression just like it is possible, then no impression is a cognitive impression. So if the Academic arguments for the indiscernibility thesis are successful, these arguments in conjunction with the Stoic maxim for assent constitute a reason *for the Stoic* to withhold assent from every impression and to suspend judgment about everything.

The Academics offered two principal arguments for the indiscernibility thesis: an argument from the existence of twins or perceptually indiscernible objects and an argument from dreams and madness. (For these arguments see Cicero, *Academica* 2.48, 2.83–5, 2.88–90; Sextus Empiricus, *Adversus mathematicos* 7.402–405, 7.408–410.) Cicero reports that the Academics also presented an argument from the capacity of God to produce in us false but convincing impressions (Cicero, *Academica* 2.47). Many commentators take these Academic arguments to be skeptical scenarios (or, more precisely, false belief scenarios). For they think that with these arguments the Academics claim to have introduced with respect to *any* perceptual impression a person entertains the uneliminated, and ineliminable, possibility that the impression is false. (See Sedley 1982: 263, Striker 1996a: 139, and Striker 1996b: 160.) So, on this line of interpretation, the Academics argued that if I have the impression that this person is Socrates, I cannot eliminate the possibility that this impression is false. For I cannot eliminate the possibility that I formed this impression as a result of looking not at Socrates but at his twin, or because I am now dreaming or mad and someone else or no one at all is now before me, or because God has produced this impression in me when it is in fact false.

But consider the Academic argument from twins or perceptually indiscernible objects. *If* it is supposed to introduce an uneliminated and ineliminable possibility, then it is a dismal failure. And that is because in the case of my impression (for example) that this person is Socrates, the argument leaves intact claims to knowledge on my part

whose truth enables me to eliminate the possibility that my impression is false because I am looking not at Socrates but at his twin. If I know that Socrates has no twin because (for example) I know that his mother reports that he has no twin, and I know that Socrates' mother is a reliable source of information on the matter, then I can eliminate the possibility that I am looking not at Socrates but at his twin and that for this reason my impression is false. For the Academic argument offers no consideration which calls into question my claim to know that Socrates has no twin or the other claims to knowledge on which this claim is based. Hence, the argument does not show that I cannot eliminate the possibility that Socrates has a twin and that I am looking not at Socrates but at his twin. In fact, it is difficult to see how the Academics (or anyone else) could construct a skeptical scenario with a scope of any significance on the basis of the fact that twins exist or that two or more objects are perceptually indiscernible.

The argument from twins or perceptually indiscernible objects is more successful if we see it as an attempt by the Academics to establish the truth of certain counterfactual conditionals. For the Academics think that the truth of the indiscernibility thesis follows from the truth of these counterfactual conditionals. So assume that Socrates does not have a twin, that I know this fact about Socrates, and that as a result of looking at Socrates I form a true impression that this person is Socrates. On my view the Academics argued that even with these assumptions in place the following counterfactual conditional is true:

- (A) *If Socrates had a twin, i.e., if there were someone who is perceptually indiscernible from Socrates, and if as a result of looking at Socrates' twin I had formed the false impression that this person is Socrates, my false impression would have represented the person before me (= Socrates' twin) as Socrates in just the same way my true impression represents the person now before me (= Socrates) as Socrates.*

The Academics think the counterfactual conditional (A) is true if it is possible for Socrates *to have had* a twin, i.e., if it is possible for there *to have been* someone who is perceptually indiscernible from Socrates. They argue that this, in turn, is possible if it is possible for two objects to be perceptually indiscernible from one another. The simplest way to prove that it is *possible* for two objects to be perceptually indiscernible from one another is to appeal to two objects that *actually are* indiscernible from one another, i.e., two eggs or two snakes or two identical twins. This is just what the Academics do.

But what follows? If (A) and other counterfactuals like it are true, the Academics argue, then every true perceptual impression of Socrates is such that some false impression just like it is possible. If that is so, then the indiscernibility thesis is true with respect to impressions of Socrates and no true impression of Socrates is a cognitive impression. For if it is possible for Socrates to have had a twin, then for any true impression of Socrates it is possible for there to have been a false impression, formed as a result of looking at Socrates' twin, that represents the object being perceived (= Socrates' twin) as Socrates in just the same way the true impression represents the object actually being perceived (= Socrates) as Socrates. But, the Academics will continue, what is true with respect to Socrates is true with respect to *any* perceptible object. (That is why Cicero says that if two objects are perceptually indiscernible from one another, then

everything will be called into doubt (*Academica* 2.84).) For any perceptible object *O*, it is possible for there to have been an object *O** distinct but perceptually indiscernible from *O*. If that is so, then for any true impression of *O* it is possible for there to have been a false impression, formed as a result of looking at *O**, that represents the object being perceived (= *O**) as *O* in just the way the true impression represents the object actually being perceived (= *O*) as *O*. If this is so, then for any object *O*, no true impression of *O* is of a kind which could not be false; therefore, for any object *O*, no true impression of *O* is a cognitive impression. If that is so, then there are no cognitive impressions. *That* conclusion in conjunction with the Stoic maxim for assent compels the Stoic to withhold her assent from every impression and to suspend judgment about everything.

The Academic argument from dreams and madness can be understood in the same way. Even if I am awake and sane when I entertain the true impression that this person is Socrates, and even if I know that this is so, the Academics argued that nonetheless it is possible for me to have entertained in a dream or episode of madness a false impression that represents it as being the case that Socrates is before me in just the way my true impression now represents this as being the case. But what is true with respect to my impression that this person is Socrates is true with respect to any true perceptual impression I entertain. If that is so, then every true impression is such that some false impression just like it is possible. Hence, no true impression is a cognitive impression. The Academic argument from dreams or madness, then, need not challenge my claim to know that, in entertaining a true impression that this person is Socrates, I am not now dreaming or mad. The argument purports to show only that it possible for me to have had in a dream or episode of madness a false impression which represents it as being the case that Socrates is before me in just the way my true impression that this person is Socrates represents this as being the case. That is true even if I can eliminate the possibility that now, in entertaining the impression that this person is Socrates, I am dreaming or mad. For an eliminated possibility is still a possibility. It is, however, a consequence of the Academic argument that if I do know that I am not now dreaming or mad, my knowing this cannot depend on my having an impression that represents something as being the case (e.g., that the person before me is Socrates) in a way that no false impression could. (For a much more detailed presentation and defense of this interpretation of the Academic arguments, see Perin 2005.)

The version of Pyrrhonian skepticism on offer in Sextus Empiricus' *Outlines of Pyrrhonism* generates a reason for suspending judgment by appealing to conflicting appearances. Suppose the tomato on the table appears red to me. A Pyrrhonian skeptic of the sort described by Sextus will submit for my consideration the fact that the tomato appears some other color, e.g., yellow, either to me in other circumstances or to someone else or to a creature of another kind. According to Sextus the fact these two appearances conflict is *not* by itself a reason for me to suspend judgment about the color of the tomato. But for Sextus if there is no rational basis for resolving this conflict of appearances, then I *do* have a reason to suspend judgment about the color of the tomato. And Sextus argues that there is no rational basis for resolving this conflict of appearances by arguing that any consideration I might take as a reason to believe that the tomato is red rather than yellow, or *vice versa*, including the fact that the tomato appears red to me now, produces an infinite regress or relies on an arbitrary assumption or involves

reasoning in a circle. But if this is so, and if neither an infinite regress nor an arbitrary assumption nor reasoning in a circle constitutes a reason for belief, then I have no reason to believe that the tomato is red rather than yellow, or *vice versa*. And *that* fact is a reason for me to suspend judgment about the color of the tomato.

Note that Sextus' argument from conflicting appearances need not satisfy the explanatory and epistemic requirements a skeptical scenario must satisfy. For in generating a reason for suspending judgment about the color of the tomato Sextus need not provide an explanation of how the tomato could appear red to me, or of how I could believe that the tomato is red, when in fact it is not. (But contrast here Curley 1978: 88–9.) Sextus proceeds on the assumption that I will suspend judgment about the color of the tomato if I take myself to lack any reason to believe that the tomato is one color rather than another. That is why his strategy is to undermine the status of *any* consideration, and especially the fact that the tomato appears red to me now, as a reason to believe that the tomato is red. But he does *not* execute this strategy by first describing a way in which the tomato could appear red to me, or I could come to believe that the tomato is red, when it is not, and then claiming that I cannot eliminate the possibility that the tomato appears red to me, or that I have come to believe that it is red, in this way. If I believe that *p*, Sextus simply introduces an alternative candidate for belief *q*, and then employs very general arguments (the so-called 'Agrippan modes': see *Outlines of Pyrrhonism* 1.164–77) that purport to show that I have no reason to assent to *p* rather than to *q*, and *vice versa*.

It seems to me, then, that Descartes was mistaken in thinking the skeptical arguments of the First Meditation are just the arguments of the ancient skeptics. The arguments of the First Meditation generate reasons for doubt by introducing in different ways the uneliminated, and perhaps ineliminable, possibility that the beliefs which fall within their scope are false. Neither the Academic nor the Pyrrhonian skeptical arguments do this. The Academics do argue that for any true perceptual impression I form, there are various ways in which I could have formed a false impression that is identical in certain important respects to my true impression. But they do *not* argue that for any impression I form, I cannot eliminate the possibility that in fact I have formed my impression in one of these ways. The Pyrrhonian skeptic generates a reason for me to withhold my assent from some candidate for belief *p* by arguing that I have no reason to assent to *p* rather than to some alternative candidate for belief *q* (where *q* is or entails the negation of *p*). The truth of *that* conclusion does not require that there is some possibility I cannot eliminate that *p* is false, but only that I have no reason to think that *p*, rather than *q*, is true.

Reasons for Doubt vs. Reasons for Suspending Judgment

In the special context of the First Meditation, a reason for doubting the truth of a proposition *p* is a reason to withhold assent from *p*. For there Descartes devotes himself to the general destruction of his beliefs, and with that end in view he declares that

Reason now leads me to think that I should hold back my assent from opinions which are not completely certain and indubitable just as carefully as I do from those which are

patently false. So, for the purpose of rejecting all of my opinions, it will be enough if I find in each of them at least some reason for doubt. (2:12; AT 7:18)

Call the principle that I should withhold my assent from p if I have a reason for doubting p the *strong maxim for assent*. (I borrow this term from Broughton 2002: 44–5.) The strong maxim for assent transforms a reason for being less than certain that p into a reason to withhold assent from p .

There is a point in the First Meditation where it seems to the meditator as if he has given up all of the beliefs he possessed at the outset of his inquiry in the *Meditations*. This is the point at which he announces that “I . . . am finally compelled to admit that there is not one of my former beliefs about which a doubt may not properly be raised; and this is not a flippant or ill-considered conclusion, but is based on powerful and well thought-out reasons (*validas & meditata rationes*) (2:14–15; AT 7:21–2). Many commentators attribute to the meditator here the claim that he has “powerful and well thought-out reasons” for doubting the truth of his belief that he has hands, for example, or his belief that $2 + 3 = 5$. (See Frankfurt 1970: 48, Curley 1978: 106, Stroud 1984: 12; Macarthur 2003: 160–4.) But the meditator makes no such claim here. He claims to have “powerful and well thought-out reasons” only for the second order conclusion:

- (C) For each of my former beliefs, there is at least some reason for doubting the truth of that belief.

The “powerful and well thought-out reasons” the meditator takes himself to have for (C) are, of course, the skeptical scenarios introduced in the First Meditation. Now (C) states that for each of the meditator’s former beliefs, he has some reason for doubting the truth of that belief. So it follows from (C) that if the meditator formerly believed that p , he now has a reason for doubting p . But (C) says or implies nothing about *the kind of reason* the meditator has for doubting p . In particular, it does not follow from (C) that the reason the meditator has for doubting p renders his belief that p *unreasonable*. If he has a reason for doubting p , then this reason renders his belief that p *uncertain*. For his belief that p is certain just in case he has no reason for doubting p . But a reason for doubt can undermine a belief’s claim to certainty without undermining its claim to reasonableness. And Descartes, in the guise of the meditator, does not think that the reasons for doubt raised in the First Meditation undermine the reasonableness of his former beliefs. For he continues to describe those beliefs as “highly probable opinions – opinions which, despite the fact that they are in a sense doubtful, as has just been shown, it is still much more reasonable (*multo magis rationi consentaneum*) to believe than to deny” (2:15; AT 7:22). (For this point see especially Broughton 2002: 47–9 and cf. Macarthur 2003: 166–71.) The fact that Descartes does not think that the reasons for doubt raised in the First Meditation undermine the reasonableness of his former beliefs explains why elsewhere he characterizes these reasons for doubt as slight (2:25; AT 7:36), metaphysical (2:25; AT 7:36, 2:121; AT 7:172, 2:308; AT 7:460, 2:373; AT 7:546), and exaggerated (2:61; AT 7:89, 2:159; AT 7:226, 2:308; AT 7:460).

This fact also explains why, by his own report, it is difficult for the meditator to give up his former beliefs or, if he does give them up, to avoid forming them again. The

meditator, like anyone else, is disposed to believe whatever he regards as the most reasonable candidates for belief. That is why he introduces the pretense of the malicious demon. This thought experiment is supposed to aid the meditator in overcoming the psychological obstacles to giving up beliefs he regards as reasonable. If he formerly believed that p , but now recognizes that he has a reason for doubting p , the meditator is supposed to retract his assent from p . That is what the strong maxim for assent tells him to do. The problem is that while the meditator recognizes that he has a reason for doubting p , he also continues to regard his belief that p as reasonable. He continues to think, in other words, that his reason for doubting p notwithstanding, he has more reason to assent to p than to withhold assent from p . And it is difficult for someone in that position to avoid believing that p .

There is an important passage in the Seventh Replies where Descartes explains the sense in which the reasons for doubt raised in the First Meditation are “powerful and well thought-out”:

There may be reasons which are strong enough to compel us to doubt, even though these reasons are themselves doubtful, and hence not to be retained later on, as I have just pointed out. The reasons are strong so long as we have no others which produce certainty by removing the doubt. Now since I found no such countervailing reasons in the First Meditation, despite meditating and searching for them, I therefore said that the reasons for doubt which I had found were ‘powerful and well thought-out’ (2:319; AT 7:473–4).

Descartes’s remarks here seem to me to require careful explication. In the First Meditation the meditator thinks that the skeptical arguments he considers compel him to doubt that he has hands or that $2 + 3 = 5$ *only* in the sense that they compel him to accept that there is some reason for doubting he has hands or that $2 + 3 = 5$. These arguments generate “strong” reasons for doubt in the sense that they provide the meditator with *genuine* grounds, however slight, for doubting that he has hands or that $2 + 3 = 5$. Since, moreover, the skeptical arguments of the First Meditation provide the meditator with genuine grounds for doubting not one or two beliefs, but each member of a very large class of beliefs, the meditator thinks that these arguments compel him to accept the second order conclusion (C). But, as we have seen, Descartes in the guise of the meditator does *not* think that the skeptical arguments of the First Meditation compel him to doubt in the sense that they rationally compel him to give up his belief that he has hands or that $2 + 3 = 5$. (If this were the sense in which these arguments compelled the meditator to doubt, the strong maxim for assent would be otiose.) The meditator continues to regard his beliefs as reasonable, and for this reason it is difficult for him to give up those beliefs. Descartes’s point here in the Seventh Replies, I think, is that in the First Meditation he did not have any reason at all for denying the second order conclusion (C). A reason for denying (C) would be a reason for the meditator to think that for at least one of his former beliefs, there is no reason at all for doubting the truth of that belief. In the absence of a reason for thinking that at least one of his former beliefs is immune to doubt, the skeptical arguments of the First Meditation provide the meditator with strong reasons for thinking that *all* his beliefs are subject to doubt.

It is more difficult to make sense of a passage from the Fourth Meditation (2:40–1; AT 7:58–60). Suppose I consider a proposition p and I cannot discern any reason to believe either p or its negation. In this case my will is “indifferent” (*indifferens*) – I feel no inclination to assent either to p or to its negation. Descartes claims that if by an exercise of will I were to assent either to p or to its negation, I would be at fault. For even if my resulting belief is true, it is true only by accident. More importantly, I have given my assent to a proposition whose truth I did not clearly and distinctly perceive: in Descartes’s language, the determination of my will has preceded the perception of my intellect. Now consider, as Descartes proceeds to do, a different kind of case. I am considering a proposition p , and though I recognize a reason for doubting p , I still regard myself as having more reason to assent to p than to assent to its negation or to suspend judgment. I am, according to Descartes, in a situation in which “probable conjectures” (*probabiles conjecturae*) incline me to assent to p . But, Descartes writes,

although probable conjectures may pull me in one direction, the mere knowledge that they are simply conjectures, and not certain and indubitable reasons, is itself quite enough to push assent the other way. My experience in the last few days confirms this: the mere fact that I found that all my previous beliefs were in some sense open to doubt was enough to turn my absolutely confident belief in their truth into the supposition that they were wholly false (2:41; AT 7:59).

Descartes here seems to me to misrepresent the experience of the meditator in the First Meditation. For there the meditator claims that it is difficult for him to withhold his assent from his former beliefs *despite* the fact that he has reasons for doubting the truth of each of those beliefs and, therefore, that he does not have “certain and indubitable reasons” for them. The meditator thinks he can detach himself from beliefs he continues to regard as reasonable only by engaging in make-believe. So if his initial confidence in the truth of his former beliefs turns into the supposition that those beliefs are false, that transformation is the product *not* of the meditator’s recognition that his reasons for his beliefs fall short of certainty and indubitability, but of a psychological trick (the pretense of the malicious demon).

Two Puzzles

Descartes, then, thought that the reasons for doubt generated by the skeptical arguments of the First Meditation do *not* by themselves constitute reasons for suspending judgment. It seems to me that Descartes’s view here raises at least two puzzles.

The first puzzle is *why* Descartes thought the skeptical arguments of the First Meditation undermine claims to certain knowledge but not claims to reasonable belief. Descartes’s view is puzzling given the fact that many philosophers and theologians in the sixteenth and seventeenth centuries used the arguments of the ancient skeptics – the very same arguments Descartes thought he was rehearsing in the First Meditation – in their effort to prove that there is no rational basis for religious belief. These arguments were taken to show that there is no (epistemic) reason to accept the basic articles of Christianity or to endorse one side rather than another in the religious controversies

that dominated the early modern period. Montaigne, for example, thought that reflection on the arguments he found in Sextus Empiricus would lead a person to suspend judgment on a wide range of matters, including matters of religion, and would thereby place her in the best possible condition to receive the gift of faith from God. (See e.g., Montaigne 1965:375, Popkin 1979:42–65, and Larmore 1998:1147–52).

The second puzzle is a puzzle about the precise force of the skeptical arguments of the First Meditation – arguments that, in one form or another, continue to preoccupy philosophers today. *If* these arguments undermine claims to certain knowledge, do they also undermine claims to reasonable belief? And if these arguments undermine claims to reasonable belief, *how* do they do so? How, that is, do they leave us in a position, if they do, in which we have not only a reason to doubt, and so a reason to be less than certain of, the truth of our beliefs about the world, but also a reason to give up those beliefs and suspend judgment? That is the position in which in different ways the arguments of the ancient skeptics, if successful, leave us. And if Descartes is wrong in thinking that the reasons for doubt generated by the skeptical arguments of the First Meditation do not by themselves constitute reasons for suspending judgment, it is the position in which these arguments, if successful, leave us.

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Part II

Mathematics and Natural Philosophy

Chapter 5

Descartes and Galileo: Copernicanism and the Metaphysical Foundations of Physics

MICHAEL FRIEDMAN

Copernicus published *On the Revolutions of the Celestial Spheres* in 1543, replacing a geocentric model of the solar system in which the Earth is at rest at the center with a heliocentric model in which all planetary bodies, including the Earth, orbit around the central sun. In the high Middle Ages a combination of geocentric Ptolemaic astronomy and Aristotelian natural philosophy had attained the status of a kind of orthodoxy, and some elements in the Catholic Church became alarmed early in the following century, at the height of the Counter-Reformation, when Galileo mounted an aggressive defense of Copernicanism, and a complementary attack on Aristotle, culminating in the publication of his *Dialogue Concerning the Two Great World Systems* in 1632. Accordingly, Galileo was condemned and sentenced to house arrest by the Roman Inquisition in June of 1633. (For basic information on the Copernican revolution and Galileo's reaction to it, see Kuhn 1957.)

As a direct result of Galileo's condemnation, Descartes suppressed his first major work, *The World or Treatise on Light*, which was to be a comprehensive exposition of his physics. According to this physics, all phenomena in nature are to be accounted for in terms of the motions and interactions of tiny parts of matter or corpuscles, which, in turn, possess only the purely geometrical properties of extension, figure, and motion, and interact with one another only by impact. In particular, according to Descartes's Copernican theory of planetary motion, and of light, the planets are carried along in a rotating vortex of invisible fluid matter with the sun – more generally a star – at the center, where the light associated with the star consists of what we now call a centrifugal pressure propagated rectilinearly from this center. Moreover, even in this early work physics was supposed to have a metaphysical foundation, for the basic law of nature governing all changes of motion of matter – the conservation of what Descartes called the total “quantity of motion” – is grounded in the unity and simplicity of God, whereby God continually recreates the entire material universe at each instant while constantly expressing the very same divine essence. But Descartes did not undertake a systematic development of metaphysics in *The World*; and he was not to do so until several years later, first as a sketch in the *Discourse on Method* of 1637 and then, most fully, in the *Meditations on First Philosophy* of 1641.

Descartes learned of Galileo's condemnation by the Fall of 1633, and he wrote to Mersenne in November to say that he was just about to send him *The World* (now

almost ready for publication), but that, on learning of Galileo's condemnation, he then had a drastic change of plans:

I was so astonished at this that I almost decided to burn all my papers or at least to let no one see them. For I could not imagine that he [Galileo] – an Italian and, as I understand, in the good graces of the Pope – could have been made a criminal for no other reason than that he tried, as he no doubt did, to establish that the earth moves. . . . I must admit that if the view is false, so too are the entire foundations of my philosophy, for it can be demonstrated from them quite clearly. And it is so closely interwoven in every part of my treatise that I could not remove it without rendering the whole work defective. But for all the world I did not want to publish a discourse in which a single word could be found that the Church would have disapproved of; so I preferred to suppress it rather than to publish it in a mutilated form. (3:40–1; AT 1:270–1)

Indeed, *The World* never appeared in Descartes's lifetime, and he did not return to his physics until the *Principles of Philosophy* of 1644, where the system of *The World* is now derived from the metaphysics of God and the soul most fully articulated in the *Meditations*. Although, as Descartes explains in an earlier letter to Mersenne in April 1630, his initial plan had been first to publish his physics and then publish on metaphysics only after he had "seen how my treatise on physics is received" (3:22; AT 1:144), his new strategy, after the condemnation of Galileo, was precisely the opposite. An understanding of what was at stake in this condemnation, and why Descartes reacted as he did, can therefore shed light on exactly how, for Descartes, physics and metaphysics are related.

The Crime of Galileo

The condemnation of Galileo in 1632 was the culmination of events beginning in the years 1615–16 in which Cardinal Robert Bellarmine, a leading Counter-Reformation theologian and member of the Roman Inquisition, played a key role. In particular, when Copernicanism was formally censured as heretical in February 1616 (on the grounds that many scriptural passages describe the Earth as stationary and the sun as moving, and that only the Church can legitimately interpret scripture), Pope Paul V asked Bellarmine to convey this censure personally to Galileo and order him both to abandon Copernicanism and refrain from teaching or defending it on pain of imprisonment. It was the perception that Galileo's publication of his *Dialogue* in 1632 had violated the terms of this order which then led to his condemnation and house arrest. Yet Galileo had earlier attempted to prevent the original censure in 1616, first in his *Letter to Castelli* of 1613 and then in his famous *Letter to the Grand Duchess Christina* of 1615. The basic points of both *Letters* are these: (1) scripture and true natural philosophy can never contradict one another, since God is the source of both nature and scripture; (2) scripture is concerned with the salvation of our souls, not with questions of natural philosophy; (3) scriptural passages that seem to contradict Copernicanism (such as the passage at Joshua 10:12 where Joshua commands the sun to stand still) need not be interpreted literally, since they are merely using common language and not addressing astronomical questions.

Bellarmino never responded officially to either of Galileo's *Letters*, but he did respond (in 1615) to a closely related *Letter* by Paolo Foscarini, and Bellarmine's response mentions both Foscarini and Galileo. Moreover, Galileo made notes on Bellarmine's response, and this "exchange" between the two raises very important methodological issues. (For these and related documents see Blackwell 1991, which I am closely following here.) Bellarmine is happy to accept Copernicanism as a mere assumption or hypothesis for saving the appearances, but not as an assertion of the real physical mobility of the Earth. Bellarmine also admits, however, that, if a "true demonstration" of Copernicanism in natural philosophy could be produced, then it would be necessary to proceed with caution in interpreting the relevant scriptural passages. But no such demonstration has been produced, and, in particular, a demonstration that Copernicanism accurately saves the appearances is not a demonstration of its truth. Galileo, for his part, concedes that a conclusive demonstration of Copernicanism has not yet been produced and that its mere success in saving the appearances is not such a demonstration. Nevertheless, Galileo does not accept the merely hypothetical interpretation Bellarmine recommends, and he continues to maintain the real physical truth of the Copernican system.

An especially clear statement of Galileo's "realism" concerning the Copernican question appears in his *First Letter on Sunspots* of 1612, which, in particular, distinguishes "mathematical" from "philosophical" astronomers. Whereas the former use any devices they can "to facilitate their calculations,"

philosophical astronomers [are those] who, going beyond the demand that they somehow save the appearances, seek to investigate the true constitution of the universe – the most important and most admirable problem that there is. For such a constitution exists; it is unique, true, real, and could not possibly be otherwise; and the greatness and nobility of this problem entitle it to be placed foremost among all questions capable of theoretical solution. (Drake 1957: 97)

Thus, Galileo firmly believes that it is one thing for an astronomical system to save the appearances, quite another for it to be "real" and "true." But what does such "reality" and "truth" amount to? How can any astronomical system go beyond saving the appearances so as to capture or correspond to the "true constitution of the universe"? It might appear that Galileo is simply expressing a naïve realism here and, more generally, that he fails to appreciate the modern hypothetico-deductive method – according to which all we can ever do is derive consequences from our theoretical hypotheses so as thereby to test them against observational data. There can thus be no question, from this point of view, of any kind of "demonstration" of such hypotheses from the observational data.

The crucial point, however, is that the new mathematical science of the seventeenth century, beginning with Galileo and culminating in Newton, involved a conception of scientific method that was self-consciously distinguished from the traditional astronomical ideal of saving the phenomena and was considerably stronger than the modern hypothetico-deductive method. Mathematics, on this conception, could not only be used to model phenomena, as had long been done in traditional astronomy; it could also be used progressively to analyze the actions of the causes of phenomena. Galileo's celebrated analysis of free fall and projectile motion was paradigmatic here, where projectile motion, in particular, is analyzed as the product of two independent actions:

a tendency to persist uniformly in horizontal motion (in accordance with what we now call the law of inertia) and a tendency to accelerate vertically downwards at a constant rate under the action of terrestrial gravity. The resulting parabolic trajectory is not simply arrived at by fitting a curve to the observed data; it is mathematically derived from an analysis of the relevant causal actions. Moreover, this analysis is itself supported empirically, at least in the case of the vertical component, by experiments verifying the constant acceleration of fall.

Finally, since our description self-consciously abstracts from all other actions (friction, air resistance, and so on), this is only the first step of the analysis. A full mathematical theory will therefore proceed progressively, as we are able to incorporate additional causal actions (beyond the assumed horizontal and vertical components representing “ideal” projectile motion in a vacuum) into our initial framework; and the result, accordingly, will be much more than one model among others for saving the appearances (or one hypothesis among others from which we can derive the observational data). Rather, the progressive ongoing interaction between mathematical causal analyses and empirical evidence will, it was hoped, ultimately result in a *unique* model – which then has the status of a conclusion mathematically “demonstrated” from the phenomena.

Copernicanism played a key role in this new methodological ideal. Whereas on the Aristotelian-Ptolemaic system, the universe is separated into two very different regions – terrestrial and celestial – governed by two very different types of principles, Copernicanism opened up the possibility of providing a unified mathematical account of the entire universe based on a single system of laws. Traditional mathematical astronomy could thereby fruitfully interact with the new mathematical theories of terrestrial phenomena just being developed by Galileo and others; and we could then hope eventually to arrive at a unique model of the entire universe resulting from a progressive mathematical analysis of all the causal actions involved. Indeed, Galileo was hoping for just this kind of progress in his theory of the tides, which aimed to derive the mathematical details of their ebb and flow from the two motions of the Earth (rotational and orbital) fundamental to Copernican astronomy. Such a mathematical analysis – at the intersection of the terrestrial and celestial realms – would have counted as a demonstration, for Galileo, of the truth of the Copernican system; and he had hoped thus to settle the matter (and avoid the original censure) as early as January 1616. The main point of difference between Galileo and Bellarmine, then, is that Galileo is operating under the new progressive ideal of scientific method: since a mathematical demonstration of Copernicanism (from the phenomena of the tides, for example) may very well be produced in the future, the Church should not *now* condemn it as heretical on the basis of an overly literal interpretation of scripture.

But Galileo’s theory of the tides was not successful, and, more generally, he did not succeed in developing a unified mathematical analysis of celestial and terrestrial phenomena. A little more than fifty years after Galileo’s condemnation, however, Newton’s *Mathematical Principles of Natural Philosophy* of 1687 finally succeeded in this project, building on earlier contributions of Galileo, Descartes, and Christiaan Huygens. In particular, Newton articulated a very general mathematical concept of force (as cause of motion) suitable for all the actions his predecessors had analyzed, and, most importantly, he applied this concept in giving the first adequate dynamical treatment of

planetary motion, which subsumed both the motions of the planets and terrestrial gravity under the single law of universal gravitation. (An especially important step in this unification was the so-called moon test, whereby Newton demonstrated that the acceleration of the moon towards the Earth is, when brought down to the surface of the Earth in accordance with the inverse-square law, quantitatively equal to the constant acceleration $g = 32$ ft. per sec. per sec. of terrestrial gravity.) Newton thereby developed what he himself called a “deduction from the phenomena” of universal gravitation, from which the (approximate) truth of the Copernican system (as perfected by Kepler) rigorously follows. (Universal gravitation also makes possible a more adequate mathematical treatment of the tides, in terms of the actions on the sea of both the moon and the sun.) In this sense, the new methodological ideal of progressive mathematical analysis in ongoing interaction with empirical evidence did in fact eventually succeed in providing what Galileo had hoped for: a unique – and thus “real” and “true” – constitution for the universe. (For further discussion of Newton’s methodology, see Cohen 1980; Smith 2002.)

A Discourse on Method

Descartes’s work before 1633 had revolved around mathematics and natural philosophy. In the years 1618–19 he had worked closely with Isaac Beeckman, who was one of the first thinkers actively to pursue a program of micro-mechanical physics – where the speeds and directions of tiny parts of matter or corpuscles, and their resulting impacts on one another, were the primary explanatory devices. In particular, Descartes had begun a mathematical analysis of hydrostatic phenomena based on a consideration of independent infinitesimal tendencies to motion (pressures) in various directions in a fluid. Shortly after this period, Descartes discovered the fundamental procedure of his new analytic geometry, involving a deep and novel connection between extended geometrical constructions (using proportional compasses) and what we now call algebraic equations (so that a uniform treatment of all algebraic curves, beginning with lines and circles, and progressing through the conic sections and then all higher-order algebraic curves, was now possible). This sparked Descartes’s ambition to articulate a new “universal mathematics” capable of solving all theoretical problems in any area of science, resulting in his early incomplete methodological study, *Rules for the Direction of the Mind*. From the mid-1620s through the early 1630s, Descartes also made groundbreaking contributions to optics (some of which involved his new geometry), and these led, step by step, to the composition of *The World*. (For a detailed discussion of the developments sketched in this paragraph and the next, see Gaukroger 1995.)

Descartes began with his formulation of the law of refraction, arrived at by factoring the motion of the incoming light ray into two independent components, perpendicular and parallel to the surface of the refracting medium, and then stipulating that only the perpendicular component is affected. But the real breakthrough came when Descartes was able to apply this law in the precise mathematical explanation of important properties of the rainbow (and related meteorological phenomena), using a sophisticated combination of mathematical and experimental analysis. It was this work, in particular, which eventuated in the complete system of physics presented in *The World* – based

on the fundamental insight that, by understanding the transmission of light from heavenly bodies as the propagation of rectilinear pressure from the center of a fluid vortex in accordance with the laws of motion (in particular, what we now call rectilinear inertia), we could thereby forge a mathematical connection between celestial phenomena (planetary motion, the production of light by stars) and terrestrial phenomena (especially in meteorology). Descartes's work in micro-mechanical hydrostatics, geometry, optics, and meteorology had all come together in a brilliant and comprehensive sketch of a new total system of cosmology and physics.

As suggested at the beginning of this chapter, Descartes had also begun serious work in metaphysics by this time; and it appears that a meeting with Cardinal Pierre de Bérulle, a leader of the French Counter-Reformation, had directly stimulated Descartes's interest in the subject. Bérulle was an Augustinian, and a return to Augustine, more generally, was a central theme of the Counter-Reformation, especially in France. Stephen Menn (1998) has argued in great detail that the character of Descartes's metaphysics of God and the soul, from this point on, was fundamentally Augustinian. In particular, Descartes follows the Augustinian "method of ascent" (ultimately derived from Platonic sources), whereby we come to a knowledge of God from a knowledge of ourselves: we first grasp that our essential nature is intellectual (and thus non-sensible and incorporeal), then appreciate the fact that our intellect is finite and imperfect, and finally arrive at knowledge of a fully perfect, infinite intellect – God. Descartes follows this method in both the *Discourse on Method* and the *Meditations*; and, as he tells Mersenne in November 1630, he had already begun work on "a little treatise of Metaphysics" in the years 1629–30: he has here found a proof "which makes me know that God exists with more certainty than I know the truth of any proposition of geometry," or, more fully, a proof of "*the existence of God and of our souls* when they are separate from the body, from which their immortality follows" (3:29; AT 1:182). Moreover, the central idea of the method of ascent – according to which self-knowledge and knowledge of God are complementary sides of the same intellectual vision – appears in the letter to Mersenne of April 1630 where Descartes first speaks of a metaphysical foundation of physics:

I think that all those to whom God has given the use of [human] reason have an obligation to employ it principally to know him and to know themselves; [t]his is the task with which I began my studies [during the past two years], and I can say that I would not have been able to discover the foundations of physics if I had not looked for them along this road. (3:22; AT 1:144)

I will here follow Menn, therefore, in the view that, from this point on, Descartes is pursuing the strategy of using the authority of Augustinian metaphysics on behalf of his own, radically anti-Aristotelian approach to physics.

However, as we observed, Descartes had initially intended to delay the publication of his "little treatise on Metaphysics" until after the publication of his physics, and he was preparing this physics for publication in 1633 – learning of Galileo's condemnation then called a halt to all these ambitious plans. Indeed, Descartes first resolved not to publish at all, since Copernicanism "is so closely interwoven in every part of my treatise" – moreover, it apparently infects even his metaphysics as well, since the latter

supplies the “foundations of my philosophy” and Copernicanism “can be demonstrated from them quite clearly.” Yet Descartes gradually arrived at the plan of publishing his optical (and then meteorological) discoveries separately. His good friend Constantijn Huygens (the father of the great mathematical physicist Christiaan) was especially encouraging in this respect, and Descartes thus writes to (Constantijn) Huygens in November 1635 about his latest plans:

I plan to add the *Meteorology* to the *Optics*, and I worked quite diligently at this during the first two or three months of this year, since I found many difficulties which I had not yet gone into and which it was a pleasure to solve; b]ut I must confess to you my somber mood: as soon as I lost hope of learning anything more about this subject, I found it impossible to take any more trouble over it, other than to put things in order and to write a preface which I intend to add to it. (3:50; AT 1:592)

As late as November 1635, then, Descartes’s plans are still quite limited, and his depressed state, arising from the failure of his original grand ambitions, is still quite evident. It appears likely, therefore, that (as Gilbert Gadoffre has argued, for example, in Grimaldi and Marion 1987) the “preface” Descartes mentions at this time was to comprise at most Part Six of what eventually became the *Discourse on Method*. Here (in the published *Discourse*) Descartes first explains why he did not publish *The World* (precisely because of the condemnation of Galileo), asserts that he has now “resolved not to publish any other work during my lifetime which was so general in scope or by which the foundations of my physics might be understood,” and says that he is instead publishing only on “certain subjects which, without being highly controversial and without obliging me to reveal more of my principles than I wished, would nonetheless show quite clearly what I can, and I cannot, achieve in the sciences” – where the only works then mentioned are the *Optics* and *Meteorology* (1:149; AT 6:74–5). In these works, in particular, he will begin with certain “suppositions” (concerning the rectilinear propagation of light), because he has “deliberately avoided carrying out [their] deductions” from the fundamental principles of his physics (1:150; AT 6:76). And he wanted to avoid such “deductions,” it is clear, because they would proceed by way of his vortex theory and thus inextricably involve him with Copernicanism.

In March 1636, however, Descartes’s plans (and mood) have dramatically shifted. As he writes to Mersenne, he now plans to publish “four treatises, all in French,” under the general title:

The Plan of a Universal Science which is capable of raising our Nature to its Highest Degree of Perfection, together with the Optics, the Meteorology and the Geometry, in which the Author, in order to give proof of his universal Science, explains the most abstruse Topics he should choose, and does so in such a way that even persons who have never studied can understand them. (3:51; AT 1:339)

Moreover: “In this *Plan* I explain a part of my method, I try to prove the existence of God and of the soul apart from the body, and I add many other things which I imagine will not displease the reader” (*ibid.*). Descartes has thus arrived at the full conception of the soon to be published *Discourse on the Method of rightly conducting one’s reason and*

seeking the truth in the sciences, and in addition the *Optics*, the *Meteorology* and the *Geometry*, which are essays in this Method. The “Plan” (the finished *Discourse*) now includes, in particular, a sketch of the method first described in the *Rules* and therefore closely connected with the *Geometry* (Part Two), and, most importantly, a sketch of a metaphysics of God and the soul (Part Four) which will only later be fully developed in the *Meditations*. The grandly expansive, ambitious Descartes has returned.

What was responsible for Descartes’s dramatic change of plans between November 1635 and March 1636? At this point, we do not really know. But there was a remarkable coincidence between Descartes’s trajectory and Galileo’s during these months, which, I believe, is well worth considering. In particular, in the years 1635–6, two friends of Galileo’s, Elia Diodati and Matthias Bernegger, attempted, in the wake of his condemnation, to spread Galileo’s ideas in Northern Europe and defend the compatibility of Copernicanism with scripture. Their main achievement was a Latin translation of Galileo’s *Dialogue*, printed in Strasbourg (where Bernegger was located) but published and distributed by the Elzeviers in Leiden, with preface dated March 1, 1635. Moreover, they had originally hoped to include Galileo’s *Letter to Christina* as an appendix, in Latin translation together with the original Italian in parallel columns, but the translation was not quite ready in time. So they instead included Foscarini’s *Letter* of 1615, together with a short selection from Kepler, and they pursued the idea of publishing the *Letter to Christina* separately: the latter finally appeared in early 1636, again printed in Strasbourg but published and distributed by the Elzeviers in Leiden, with preface dated February 1, 1636. This was the first time the *Letter to Christina* had ever been published, now bearing the title *New-Old Doctrine of the Most Holy Fathers and Esteemed Theologians on Preventing the Reckless Use of the Testimony of the Sacred Scriptures in Purely Natural Conclusions That Can Be Established by Sense Experience and Necessary Demonstrations*. (For a discussion of the Strasbourg editions, see Finocchiaro 2005.)

The reason this is relevant is twofold. On the one hand, the principal “most holy father” serving as an authority for Galileo is Augustine, who is quoted repeatedly in the *Letter*. In particular, Galileo makes frequent use of passages from Augustine’s *The Literal Meaning of Genesis* to argue that, where scripture appears to assert something about phenomena in the heavens, and this concerns a point that is still in doubt but may eventually be “established by sense experience and necessary demonstrations,” then we should not interpret scripture overly literally on this point, on pain of making scripture look foolish. Indeed, in the Strasbourg edition, one such quotation from Augustine occurs on the second page, clearly set off in italicized Latin (as are all subsequent quotations) from the two parallel Latin-Italian columns. On the other hand, in February and March of 1636, Descartes himself was in Leiden, having come there precisely to discuss the publication of his new work with the Elzeviers. Indeed, Descartes begins the letter to Mersenne where he first announces his plans for the *Discourse* by explaining that he has been in Leiden for discussions with the Elzeviers, but has now “resolved to go to someone else” (3:51; AT 1:338). It appears quite possible, therefore, that Descartes may have seen a copy of the new Strasbourg edition during these discussions. (After all, Descartes makes it very clear to everyone in Part Six of the *Discourse* – which may well have comprised his original “preface” to the *Optics* and *Meteorology* – that Galileo’s condemnation was a crucial event for him.)

If Descartes had seen a copy of Galileo's *Letter* at this time, a new version of his Augustinian strategy could then have snapped into place. Whereas Galileo had pursued the relatively weak (and ultimately unsuccessful) strategy of using Augustine to establish the compatibility of Copernicanism and scripture, he, Descartes, had something much stronger up his sleeve: he could show that a proper understanding of Augustinian metaphysics provides the foundation for an essentially Copernican and anti-Aristotelian cosmology and physics. In particular, he could now publish his Augustinian metaphysics of God and the soul first, without explaining his full system of cosmology and physics, and later develop this physics and cosmology separately, after his metaphysics had already been accepted. Counter-Reformation Catholicism – especially in France – would thereby be forced to accept Descartes's new physics before the question of Copernicanism could even arise. And, in any case, although the idea that Descartes may have in fact seen a copy of Galileo's *Letter* at Leiden is still largely conjectural, there is no doubt that it was precisely this strategy on which Descartes now embarked, first in the *Discourse* and then, most fully, in the *Meditations*.

The Metaphysical Foundations of Physics

Descartes asserts that the *Meditations* contains the foundations of his physics in a letter to Mersenne of January 1641:

I may tell you, between ourselves, that these six Meditations contain all the foundations of my physics. But please do not tell people, for that might make it harder for supporters of Aristotle to approve them. I hope that readers will gradually get used to my principles, and recognize their truth, before they notice that they destroy the principles of Aristotle. (3:173; AT 3:297–8)

Here his new strategy is clearly evident; and it is even more evident a few months later (now linked explicitly to Galileo's condemnation), when he explains that his aim is

to fight with their own weapons the people who confound Aristotle with the Bible and abuse the authority of the Church in order to vent their passions – I mean the people who had Galileo condemned. They would have my views condemned likewise if they had the power; but if there is ever any question of that, I am confident I can show that none of the tenets of their philosophy accords with the Faith so well as my doctrines. (3:177; AT 3:349–50)

Descartes's new strategy is to show that his doctrines best accord with the Faith before the question of Copernicanism even arises, and this is why, in particular, he adds a dedicatory letter to the Sorbonne addressed *To those most learned and distinguished men, the Dean and Doctors of the sacred Faculty of Theology at Paris*. Indeed, Descartes had earlier written to Mersenne in November 1640 about his concern for “the approbation of the Sorbonne, which I want, and which I think may be very useful for my purposes, for I must tell you that the little book on metaphysics which I sent you [the *Meditations*] contains all the principles of my physics” (3:157; AT 3:233).

In what sense, however, do Descartes's six meditations contain all the principles of his physics? They do not contain the metaphysical foundation Descartes had presented

in *The World* (and will later publish in the *Principles of Philosophy*), according to which the fundamental laws of motion (conservation of the total “quantity of motion,” together with what we now call rectilinear inertia) are grounded in the unity and simplicity of God. Indeed, in Part Five of the *Discourse*, where Descartes summarizes some of the content of *The World*, he is careful not to “reveal the whole chain of other truths that I deduced from these first ones [the metaphysics of Part Five],” because “in order to do this I would have to discuss many questions that are being debated among the learned, and I do not wish to quarrel with them” (1:131; AT 6:40). In particular, although he is willing to say that “I showed what the laws of nature were, and without basing my arguments on any principles other than the infinite perfections of God, I tried to demonstrate . . . those laws,” he deliberately does not say what these laws actually are (1:132; AT 6:43). This would take him too close to his vortex theory and the issue of Copernicanism – and, in the *Meditations*, Descartes does not even mention such a derivation of the laws of nature.

In his prefatory Synopsis of the *Meditations*, Descartes explains that he will develop “a distinct concept of corporeal nature, . . . partly in the Second Meditation . . . and partly in the Fifth and Sixth Meditations” (2:9; AT 7:13). In particular, whereas the Fifth Meditation, and parts of the Second (the famous piece of wax argument), are concerned with “the essence of material things,” the Sixth is concerned with “the existence of material things.” The essence of matter, for Descartes, is of course pure spatial extension: “the extension of quantity (or rather of the thing which is quantified) in length, breadth and depth” (2:44; AT 7:63). For, of all the properties matter is supposed to possess, only this is clearly and distinctly conceived by the intellect – namely, as the object of pure geometry. By the end of the Fifth Meditation, then, we know the essence of “the whole of that corporeal nature which is the object of pure mathematics” (2:49; AT 7:71), but, as Descartes reiterates at the beginning of the Sixth, we do not yet know that corporeal nature in this sense actually exists. Proving this is precisely the burden of the Sixth Meditation itself, whose argument for the existence of matter is in fact peculiar to the *Meditations*. It does not appear at all in Part Four of the *Discourse*, and, when Descartes later arrives at the corresponding point in the *Principles*, he simply refers the reader back to the *Meditations* (Part One, §30; compare Part Two, §1).

Before Descartes begins the argument, he suggests that, in order to move beyond the merely possible existence of extended matter to its actual existence, we need also to move beyond the pure intellect:

But besides that corporeal nature which is the object of pure mathematics, there is much else that I habitually imagine, such as colors, sounds, tastes, pain and so on – though not so distinctly. Now I perceive these things much better by means of the senses, which is how, with the assistance of memory, they appear to have reached the imagination. So in order to deal with them more fully, I must pay equal attention to the senses, and see whether the things which are perceived by means of that mode of thinking which I call “sensory perception” provide me with any sure argument for the existence of corporeal things. (2:51; AT 7:74)

Thus, although only ideas of the intellect are clear and distinct, while sensory ideas, by contrast, are generally obscure and confused, we still need to consider the contribution of the senses in order to establish the actual existence of material things. Several pages

later, immediately before presenting the argument, Descartes puts the point this way: “[A]lthough I do not think I should heedlessly accept everything I seem to have acquired from the senses, neither do I think that everything should be called into doubt” (2:54; AT 7:77–8).

At the end of the argument, immediately after concluding that “corporeal things exist,” Descartes qualifies this conclusion by again distinguishing between purely intellectual ideas of external bodies and the ideas they produce by means of the senses:

They may not all exist in a way that exactly corresponds with my sensory grasp of them, for in many cases the grasp of the senses is very obscure and confused. But at least they possess all the properties which I clearly and distinctly understand, that is, all those which, viewed in general terms, are comprehended in the object of pure mathematics. (2:55; AT 7:80)

Once again, therefore, the essence of matter is purely intellectual, but we need explicitly to consider its effects on our senses in order to know that this essence exists in nature. Indeed, to say that purely geometrical extended matter actually exists, for Descartes, is to say that it is precisely this object – not God himself nor any other non-extended being – which is the cause of our sensory ideas.

Descartes’s argument for this conclusion, of course, directly appeals to the veracity of God:

[S]ince God is not a deceiver, it is quite clear that he does not transmit [sensory] ideas to me either directly from himself, or indirectly, via some creature which contains the objective reality of the ideas not formally but only eminently. For God has given me no faculty at all for recognizing any such source for these ideas; on the contrary, he has given me a great propensity to believe that they are produced by corporeal things. So I do not see how God could be understood to be anything but a deceiver if the ideas were transmitted from a source other than corporeal things. (2:55; AT 7:79–80)

And this argument, in turn, appears initially disappointing. But it is not problematic simply because Descartes here appeals to the veracity of God. After all, basing all the rest of our knowledge on a knowledge of God is fundamental to Descartes’s Augustinian project, and it applies equally to our intellectual knowledge of pure mathematics. The real problem, rather, is that it is not immediately clear how the “great propensity to believe that [sensory ideas] are produced by corporeal things” differs from the “natural impulse” to believe that my sensory ideas “must come from things located outside me” which has been previously discussed, and dismissed, in the Third Meditation (2:26–7; AT 7:38–9). Indeed, this same “natural impulse” there led me (falsely) to believe that my sensory ideas *resemble* corporeal things as well.

However, the Third Meditation also makes a sharp distinction between what is taught by a spontaneous natural impulse and what I learn through a “natural light”:

When I say “Nature taught me to think this [that sensory ideas resemble corporeal things],” all I mean is that a spontaneous impulse leads me to believe it, not that its truth has been revealed to me by some natural light. There is a big difference here. Whatever is revealed to me by the natural light . . . cannot in any way be open to doubt. This is because there

cannot be another faculty both as trustworthy as the natural light and also capable of showing me that such things are not true. (*Ibid.*)

By contrast, our natural impulse to believe that sensory ideas resemble corporeal things can easily be shown to be delusory:

I think I have often discovered a great disparity [between sensory ideas and their objects] in many cases. For example, there are two different ideas of the sun which I find within me. One of them, which is acquired as it were from the senses and which is a prime example of an idea which I reckon to come from an external source, makes the sun appear very small. The other idea is based on astronomical reasoning, . . . and this idea shows the sun to be several times larger than the earth. Obviously both of these ideas cannot resemble the sun which exists outside me; and reason persuades me that the idea which seems to have emanated most directly from the sun itself has in fact no resemblance to it at all. (2:27; AT 7:39)

Thus, the natural light of reason – the pure intellect – can and does correct our sensory ideas: in particular, it corrects our natural impulses initially associated with these ideas. But we have no further faculty capable of correcting the pure intellect.

This point represents the crux, I believe, of the argument of the Sixth Meditation. For, in the first place, immediately before emphasizing our “great propensity” to believe that sensory ideas proceed from corporeal things, Descartes says that “God has given me no faculty at all for recognizing any [other] source for these ideas.” Although our original naïve belief that the causes of our sensory ideas resemble them can be corrected and refined by the pure intellect, our considered judgment that Cartesian pure extension alone causes these ideas cannot, if false, be corrected by any human faculty: if *this* were our predicament, God would indeed be a deceiver. And, in the second place, immediately after concluding the argument, with the assertion that material things therefore “possess all the properties which I clearly and distinctly understand, that is, all those which, viewed in general terms, are comprehended in the object of pure mathematics,” Descartes goes on to extend this conclusion to all of our (potential) knowledge of nature:

What of the other aspects of corporeal things which are either particular (for example that the sun is of such and such a size or shape), or less clearly understood, such as light or sound or pain, and so on? Despite the high degree of doubt and uncertainty involved here, the very fact that God is not a deceiver, and the consequent impossibility of there being any falsity in my opinions which cannot be corrected by some other faculty supplied by God, offers me a sure hope that I can attain the truth even in these matters. (2:55–6; AT 7:80)

Beginning with a firm grasp of Cartesian pure extension (“the object of pure mathematics”), I can then correct and refine my sensory representation of nature: first by developing a rational (astronomical) knowledge of the sun and other heavenly bodies, then inquiring into the main causal processes (such as light) by which sensory ideas are conveyed to me, and finally, on this basis, developing a progressive scientific understanding of all the remaining phenomena in nature (including physiology and

medicine). Clear and distinct knowledge of the pure intellect, in interaction with or applied to the deliverances of the senses, thereby provides the one and only possibility for a genuine, rational knowledge of nature. Physics – *Cartesian* physics – now has a metaphysical foundation.

This interpretation of Descartes's argument for the existence of matter in the Sixth Meditation was first presented in Friedman (1997); and, if it is correct, we are now in a position to see that the metaphysical foundation for physics contained in the *Meditations* is, above all, a foundation for the new ideal of scientific method first suggested by Galileo – according to which we use pure mathematics, in interaction with or applied to the deliverances of our senses, to analyze the actions of the causes of natural phenomena so as progressively to refine our scientific understanding of these phenomena. And, although Descartes does not say so here, the crucial role of Copernicanism in this process is evident to all who have eyes to see: it is precisely by integrating celestial and terrestrial phenomena within a single mathematical description of nature (as Galileo attempted in his Copernican theory of the tides and Descartes attempted in his vortex theory of planetary motion and light) that the new methodological ideal can most clearly bear its intended fruit. By the argument of the Sixth Meditation, however, these methodological ambitions of the new mathematical science have been shown to rest on the Augustinian metaphysics of God and the soul Descartes develops in the first three meditations.

More precisely, the sense in which Descartes's six meditations contain all the foundations of his physics can now be elucidated as follows. We first comprehend that our own nature is purely intellectual; we then come to see that this nature is entirely dependent on God; and we finally understand how our purely intellectual nature, when applied to the deliverances of the senses, provides the basis for the one possible science of (corporeal) nature. Just as Augustinian intellectual contemplation of God and the soul provides a foundation for the new scientific method, this scientific method is a manifestation or expression of Augustinian intellectual contemplation – and it is therefore the new mathematical science rather than Aristotelian natural philosophy which best accords with the Faith. It is not that Descartes provides a foundation for the new scientific method by providing some kind of guarantee that it will necessarily succeed. Indeed, Descartes expresses considerable ambivalence, in the *Principles* (Part Four, §§204–7), about whether the *unique* model this method aims at can actually be achieved. This method, as Descartes himself puts it, rather provides us with our one “sure hope” for a rational knowledge of nature, a hope which is itself firmly grounded, in turn, in a thoroughly orthodox account of our rational knowledge of God and soul.

Finally, if the present interpretation is correct, there is an additional twist to Descartes's argument, which, viewed in the context of the Fourth Meditation and the remainder of the Sixth, brings Descartes even closer to Augustine in one respect, while simultaneously distancing him from Augustine in another. Menn (1998) has argued convincingly that Descartes's treatment of the origin of error in the Fourth Meditation is closely modeled on Augustine's treatment of the origin of evil in such works as the *Confessions* and *On Free Choice of the Will*. Evil is not a positive reality but a privation – a defect in our finite, not fully perfect nature, which thereby participates to some extent in non-being. Moreover, evil originates with the exercise of our own free choice,

and it is better that we have such choice, all things considered. But could God not have created finite creatures with free choice who nonetheless never sin? Certainly; and, in fact, he has already done so: the angelic souls who stand at the summit of the order of creation, and whose special office is to maintain the cosmic order. Yet our distinctively human office, as purely intellectual souls imprisoned in a body, is quite different; and this is why, as Menn puts it, “we have been placed in corruptible terrestrial bodies, toward the bottom of the chain of physical causality, while the angels have been given charge over the incorruptible celestial bodies which preserve the order of the physical universe” (1998: 181). Nevertheless, a universe containing both human beings, who are liable to sin, and privileged angelic souls, who are not, is better overall than one containing only angels. For “God, in placing the soul in a mortal body, is dispensing goodness even to the lowest part of creation, allowing the corruptible body to receive perfection through a soul that is capable of following divine order” (Menn 1998: 183).

Descartes follows this same strategy in the Fourth Meditation, now applied to the problem of intellectual error (falsehood) rather than moral evil (sin). Just as in the case of moral evil, intellectual error originates in the exercise of our own free will – which, being infinite, may greatly exceed the capacity of our finite, purely intellectual grasp of clear and distinct ideas. The main source of such error, in fact, is extending our capacity for judgment (which, for Descartes, is an exercise of our will) to matters about which we do not yet have a clear and distinct understanding. Chief among these, of course, are the initial deliverances of our senses, which, by a natural and spontaneous impulse, we take to resemble the external corporeal things from which they proceed. But could God not have created us with a finite intellect together with an infinite free will, and such that we would nonetheless never err? Certainly; and Descartes explicitly considers this possibility:

Had God made me this way, then I can easily understand that, considered as a totality [French edition: as if there were only myself in the world], I would have been more perfect than I am now. But I cannot therefore deny that there may in some way be more perfection in the universe as a whole because some of its parts are not immune from error, while others are immune, than there would be if all the parts were exactly alike. And I have no right to complain that the role God wished me to undertake in the world is not the principal one or the most perfect of all. (2:42–3; AT 7:61)

As Menn (1998: 320) points out, Descartes is here tacitly assuming the existence of angels, and appealing, like Augustine before him, to our distinctively human office as an inferior but still very important part of creation as a whole.

But what exactly is this distinctively human office? The present interpretation of the sense in which Descartes provides a metaphysical foundation for physics yields a perhaps surprising result. Descartes explains in the remainder of the Sixth Meditation that our nature is that of a mind-body composite, and, “notwithstanding the immense goodness of God, the nature of man as a combination of mind and body is such that it is bound to mislead him from time to time” (2:61; AT 7:88). Since our intellectual soul is inextricably lodged in an animal body, it can receive information about the configuration of corporeal nature around it only by means of the stimulation of the senses. The primary function of the senses, for all organic bodies, is to alert the body to features of

its environment that may be helpful or harmful, and, in general, the senses perform this function quite reliably. Unlike the other animals, however, we are also spiritual beings with intellect and will, who, in our initial state of childish immaturity, naturally make judgments about the deliverances of our senses without yet being able to appreciate the difference between clear and distinct ideas (of the intellect) and obscure and confused ideas (of the senses). It is then precisely the task of Cartesian science to employ the pure intellect in a progressive ongoing refinement of these deliverances by applying the method of the new mathematical natural philosophy.

It is precisely by doing Cartesian science, then, that we best fulfill our distinctively human office. It is in this way, as Descartes once described the project of his *Discourse*, that we pursue a “Plan of a Universal Science which is capable of raising our Nature to its Highest Degree of Perfection,” and it is here, in particular, that we encounter Descartes’s most fundamental divergence from Augustine. We do not pursue the perfection of our nature by means of a purely spiritual discipline of intellectual contemplation of God and the soul. On the contrary, the fruit of such intellectual contemplation, for Descartes, is an active engagement with the world in the practice of the new mathematical science – which, through the ongoing development of physiology and medicine, will eventually address the problem of human moral perfectibility as well. Descartes’s vision, in the end, is in this way profoundly modern, and he thus points the way towards the later scientific humanism of the eighteenth-century Enlightenment. But this is a story for another occasion.

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Chapter 6

Explanation as Confirmation in Descartes's Natural Philosophy

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The linked concepts of explanation and confirmation play a major role in Descartes's natural philosophy. But that role turns out to be something other than the one that the most general principles of that philosophy would have led one to expect, other, indeed, than what Descartes himself had originally expected. Like Aristotle before him, he held out the promise of a science of nature that would be in broad terms deductive; warrant would descend majestically downward from premises themselves intuitively secured. In this way would certainty, the supreme goal of his discursive effort, be assured. No additional confirmation would be needed. Two and only two epistemic processes would be involved: intuition and deduction.

But the universe he had assiduously fashioned so as to yield itself to this plan quickly proved recalcitrant, as Aristotle's had done, and for some of the same reasons. The downward flow of deductive warrant wavered and a very different mode of confirmation had to be brought in to the rescue, one less easy to subject to rule than deduction would have been. Around this shift, the entire Cartesian project of a certainty-producing science of nature hung in the balance. Aristotle has already been mentioned. It seems appropriate, then, to begin with a brief sketch of how he dealt with an issue that would become much more troublesome for Descartes.

Aristotelian Prelude

As far as Aristotle was concerned, the mark of science proper (*epistêmê*) is successful demonstration (*apodeixis*). Demonstration proceeds deductively from premises known through *epagôgê* (roughly, intuition) to be true in their own right to a conclusion which is thereby both explained and proved. In the simplest case, the premises should explain what causes a particular nature necessarily to possess a particular characteristic. We should not have to have recourse to the conclusion in order to prove the truth of the premises. "Since the primary premises are the cause of our knowledge, that is, of our conviction, it follows that we know them better, that is, are more convinced of them than of their consequences, precisely because our knowledge of these latter is the effect of our knowledge of the premises" (*Posterior Analytics* 1, 2; 72a 30–2).

But a difficulty immediately looms, one of which Aristotle was, I think, well aware. When we try to explain something in terms of its cause, that something is ordinarily better known to us than is the cause we are to search for. The latter may qualify as "better known in itself" once the demonstration goes through, more intelligible, that is, in its role as cause. But this does not help very much. It is what is better known to *us* that allows the demonstration to progress in the first place. Things more intelligible in themselves "are on the whole the hardest for men to know, for they are farthest from the senses" (*Metaphysics* I, 2; 982a 23–5). It is the *conclusion* of the demonstration that is closest to the senses, closest therefore to our immediate experience. How is the direction to be reversed, as the notion of demonstration seems to demand?

Aristotle distinguishes between "knowledge of the fact" (*oti, quia*) and "knowledge of the reasoned fact" (*dioti, propter quid*). To have knowledge of the fact means having a proof merely of the truth of the claim in question. Knowledge of the reasoned fact requires in addition an understanding of *why* it is true, what the causal connections are. By way of illustration, he turns to celestial phenomena even though he elsewhere notes that the heavenly bodies "are excellent and divine but less accessible to knowledge. The evidence that might throw light on them . . . is furnished but scantily by sensation" (*Parts of Animals* I, 5; 644b 25–7). Perhaps he chose the examples he did because the explanations he can offer in these cases are so plausible that he could disregard, in effect exclude, the likelihood of alternative explanations and in that way, as we shall see, convert explanation into demonstration.

An example of a proper demonstration, he says, would be: "Whatever is spherical waxes in a certain way. The moon is spherical. Therefore, the moon waxes in that way" (*Posterior Analytics* I, 13; 78b 3–13). This *explains* the observed lunar property of waxing. But how does one know that the moon is spherical? Aristotle suggests that we alter the order of the syllogism: "Whatever waxes in a certain way is spherical. The moon waxes in that way. Therefore, it is spherical." This provides the "knowledge of the fact," i.e., of the sphericity of the moon, that the earlier syllogism needed to make it fully demonstrative. But does it work? (McMullin 1992).

He notes, in passing as it were, that for this argument to hold, the major premise has to be "convertible," logically, that is, it must hold good irrespective of the order of the terms. Now while a simple piece of geometrical reasoning will show that whatever is spherical will wax in a certain way (given a couple of plausible assumptions about light), it is by no means true that whatever waxes in a certain way is spherical. True, it is highly plausible. But it must be more than that for a strict demonstration to go through.

An even more striking example: "Nearby luminous objects do not twinkle. Planets are nearby luminous objects [relative to the fixed stars]. Therefore, they do not twinkle" (*Posterior Analytics* I, 13, 78a 30–78a 2). Once again, this appears to be a proper demonstration of the reasoned fact since the nearness of the planets is presented as the cause of their non-twinkling. But is it? We need to know first that it is true that the planets are near. So according to instructions, we convert the major premise which becomes: "Luminous objects that do not twinkle are nearby." And then the demonstration of the needed fact follows: "Planets do not twinkle. Therefore, they are nearby." It is even more obvious in this case that the conversion of terms in the major premises is

illegitimate: it by no means follows from any information given that luminous objects that do not twinkle are nearby. For all that was known then, some of them could be even further away than the fixed stars!

Aristotle's laconic instruction to exchange the order of the terms in the major premises, giving no reason why this should be permissible, does not do justice to what is *really* going on in examples such as these. There is no need for the (defective) "demonstration of the fact." What Aristotle is assuming, in effect, is that the explanation offered by the middle term in each case (the spherical shape of the moon, the nearness of the planets) is the *only possible* explanation of the observations he cites, that the explanation is highly plausible and that no alternative explanation immediately offers itself.

The inference clearly depends on the quality of the explanation offered, rather than on the intuitive warrant of the individual premises. It is no longer strictly syllogistic or intuitive-deductive. It is instead retroductive, to call on a useful label we owe to C. S. Peirce, "retro" because it is an inference from known effect back to explanatory cause. What distinguishes retroduction from the other two main forms of inference employed in inquiry into nature, deduction and induction (inductive generalization), is its reliance on explanatory quality for its epistemic force (McMullin 1992).

But it is not just retroductive. It makes a stronger claim than does an ordinary retroductive inference, which relies only on the intrinsic quality of the explanation given. In order to approximate to his original deductivist ideal, Aristotle also implicitly assumes that it is the *only* explanation, and hence is deducible from the effect. This clearly requires additional argument of a methodologically different sort, establishing that this is the *only possible* explanation. How would this be done? Reviewing all the different possible alternatives? Showing that no other explanation is possible? There is a suggestion here of what in recent times has been dubbed "inference to best explanation" (IBE). It too is a special sort of retroductive inference, needing a second, methodologically diverse, sort of argument to show that, as well as explaining the data, it is the *best* explanation, the best presumably among the explanations on offer.

As it stands, the inference on which Aristotle is relying in order to conclude that the relative nearness of the planets is the cause of their light's not being of the twinkling variety is the simple retroductive one appealing to the quality of the explanation this affords. He makes no further attempt to show that this is the best explanation available, let alone that it is the only one. The distinction between these three: explanation, best explanation, only explanation, also signifies a difference between three levels in the confirmation they confer on the hypothesis involved. (It is worth noting that the term *confirm* is troublesomely ambiguous between these three levels in ordinary English usage.) Let us call them: *level 1*, claiming to confer some degree of plausibility; *level 2*, laying claim to a higher level of plausibility, and *level 3*, asserting outright proof, amounting in effect to a form of demonstration *dioti* (*propter quid*). Aristotle claims level 3 confirmation for his planetary illustration above, but it comes in at best at level 2. This distinction will be of service when we come to assess the kind of confirmation that explanation is taken to afford in Descartes's natural philosophy.

Cartesian Ambition

Descartes's original ambition in his natural philosophy strikes one as being similar to Aristotle's, though with the significant substitution of certainty for demonstration as the goal. Like the ideal of method proposed by Aristotle, that of Descartes in his early work, the *Regulae*, likewise reduces to two steps, bearing the same names, at least, as those in the Aristotelian scheme: intuition and deduction. Warrant begins from the top and then, supposedly, is carried deductively downward, stage by stage, to knowledge of more particular natures. So the certainty granted by the intuition of principles is steadily transmitted downwards from level to level.

To clarify what Descartes means by "intuition," the first of the two key terms in this scheme, the *Regulae* has this to say:

By "intuition" I do not mean the fluctuating testimony of the senses or the deceptive judgment of the imagination as it botches things together, but the conception of a clear and attentive mind, which is so easy and distinct that there can be no room for doubt about what we are understanding. Alternatively, and this comes to the same thing, intuition is the indubitable conception of a clear and attentive mind which proceeds solely from the light of reason. (1:14; Rule 3; AT 10:368)

So the testimonies of the senses and the imagination are rejected as sources of certainty at the level of the principles constituting the starting point of the new science of nature. This certainty derives solely from the conception of a clear and attentive mind. Nevertheless, the senses may be indirectly involved at a later level. When discussing whether a natural power can travel instantaneously to a distant place, Descartes says that the response should not start from considerations of magnetism and light directly, since these are not the sort of "easy and accessible" matters yielding a starting point for which certainty could be claimed. Instead: "I shall rather reflect on the local motions of bodies, since there can be nothing in this whole area that is more readily perceivable by the senses" (Rule 9; 1:34; AT 10:402). In this important example, key to the entire treatment of light in the *Optics*, intuition evidently works on the deliverances of the senses, transforming them so as to yield a certainly-known principle that can serve as starting point for what comes after. The echo here of Aristotle's notion of *epagôgê* is unmistakable.

This emphasis on the ability of mind to formulate epistemically secure first principles remains a constant in Descartes's later writings, though he finds different ways of grounding it. In the *Discourse*, for example, he speaks of deriving his "principles only from certain seeds of truth which are naturally in our souls" (1:143–4; AT 6:64). While in the *Principles* he speaks, rather, of clear and distinct ideas:

A perception which can serve as the basis for a certain and indubitable judgment needs to be not merely clear but also distinct. I call a perception "clear" when it is present and accessible to the attentive mind . . . [and] "distinct" if, as well as being clear, it is so sharply separated from all other perceptions that it contains within itself only what is clear. (1:207–8; AT 8A:22)

On these rather different ways of characterizing the ways that the mind may arrive at first principles, the original Cartesian ambition for natural philosophy squarely rests.

Complementing intuition in Descartes's two-part epistemic schema is what he calls "deduction." Given that he is frequently critical of the way in which formal logic cramps the mind (1:57; AT 10:439; 1:119, AT 6:17), it is not surprising to find that "deduction" for him can range all the way from the strict formal inferences of the mathematician to sequences of reasoning that could not possibly qualify as deductive in the usual sense. (See, for example, his discussion of the causes of color in the rainbow, *Meteorology*, AT 10:331ff.) The French term *deduire* was already quite ambiguous in the usage of that time. Rather than "deduce" in the logical sense, it meant deduct, or alternatively, draw out, enumerate (Clarke 1982: 65–70; 207–10). In this latter sense, it could be conflated with "induction" where this is taken to mean the enumeration of the stages to be followed in developing an explanation or in laying out the alternatives to be considered at one of the stages of a complex inference. "The deduction is made through intuition when it is simple and transparent, but not when it is complex and involved. When the latter is the case, we call it 'enumeration' or 'induction,' since the intellect cannot simultaneously grasp it as a whole" (Rule 11, 1:37; AT 10:408). See, for example, Descartes's determination of the lens shape required to bring parallel light-rays to a focus (Rule 8, 1:28; AT 10:394–5).

The close affinity between deduction and explanation, as Descartes understands them, is of particular importance to us here. In the context of his natural philosophy, to deduce from true principles is also to explain correctly what is deduced. So that deduction and correct explanation go hand in hand. Proceeding from cause to effect in this way can be described as both deductive and explanatory. However, working back from effect to cause can be explanatory without being deductive; this is where hypothesis comes in. And proceeding deductively from cause to effect can be explanatory without its necessarily providing the correct explanation where the cause is hypothetically postulated. Descartes frequently points in the direction of an explanation without actually having worked out the details, taking this to be already a sort of promissory explanation. The step from cause to effect in such cases would likewise be deductive only in a loose promissory sense, resting in effect on the strength of the explanatory appeal. But "deduction" it is for Descartes nonetheless, in a system which would allow only two epistemic procedures.

If the Cartesian ambition in regard to procedure still shows the influence of Aristotle, the same is not true in another domain where that ambition involved a complete departure from the older tradition. His insistence in his epistemology on the primacy of clear and distinct ideas leads him to an extreme form of reductionism in his ontology where all that he admits are "bodies which are extended in length, breadth, and depth, and which have various shapes and move in various ways." That, he says, is all he needs "to deduce the truth of other things" (*Principles*; 1:184; AT 9B:10). Matter, which had been indeterminate in the Aristotelian tradition, is now defined by extension, in effect combining matter and an accidental form into one (as Aristotle understood those terms) and in this way making matter entirely accessible to geometrical analysis. The laws of mechanics are three only and are said to follow "manifestly from the mere fact that God is immutable" (1:96; AT 11:43). In modern terms, they amount to continuity of state (shape, rest, motion) unless disturbed, conservation of motion (momentum),

and something akin to rectilinear inertia (*Le Monde* 1:93–7; AT 11:38–46). Finally, causal action between bodies can take place only through contact.

Reduction on this scale forces him to a new level of explanation, one which has no parallel in Aristotelian natural philosophy. Properties like color and weight which are simple givens for Aristotle now have to be explained (or explained away) in terms of extensions (or bodies) and motion alone, a daunting task for anyone less committed to clear and distinct ideas than was Descartes. Like the atomists of old, he can only have recourse at this point to the microlevel, to a domain of particles that lies far below the reach of the human senses. It is in terms of these and their motions that all the immense variety of the sensed world will have to be explained. The task of explanation in natural philosophy has to be shifted an entire level downwards, and what is far more problematic in epistemic terms, to a level that can only be imagined, not observed.

It is thus necessarily retroductive: the world of the senses becomes a vast set of effects for which the causes, themselves not directly accessible, have to be established by indirect means. Where retroduction was an incidental feature in Aristotle's one-level sense-given world, it becomes altogether central for Descartes. Plausible explanation begins to complement, almost to supplant, deduction from secure first principles as a source of confirmation. And imagination as the source of explanation takes the place of intuition. What greatly complicates his task is his commitment to certainty in natural philosophy. Hypothesis for him will not do. The inference has to be not only to plausible explanation, but to best (indeed, only) explanation, conferring level 3 confirmation. As we follow the course of his thought in his successive writings, we will see how he struggles to make good on this promise.

From *Le Monde* to the *Discourse*

Already in *Le Monde*, his first attempt at an all-encompassing cosmic physics, left unfinished and unpublished at the news of Galileo's condemnation, Descartes is blending two very different epistemic strategies. He opens by appealing to imagination: "Allow your thought to wander beyond this world to view another world – a wholly new one which I shall bring into being before your mind in imaginary spaces" (1:90; AT 11:31). And he reinforces this theme: "Now since we are taking the liberty of fashioning [the matter of this imagined universe] as we fancy, let us attribute to it, if we may, a nature in which there is absolutely nothing that everyone cannot know as perfectly as possible" (1:90; AT 11:32).

And what would that be?

Nor should [philosophers] find it strange if I conceive its extension, or the property it has of occupying space, not as an accident but as its true form or essence. For they cannot deny that it can be conceived quite easily in this way. And my purpose is not to explain . . . but only to make up, as I please, a world in which there is nothing that the duller minds are incapable of conceiving. (1:92; AT 11:36)

The initial test of this model universe is, therefore, one's ability to imagine it. It must have no property – like gravity, for example – whose operation one cannot imagine,

that, in effect, one cannot represent geometrically: "Since everything that I propose here can be distinctly imagined, it is certain that even if there were nothing of this sort in the old world, God can nevertheless create it in a new one. For it is certain that he can create anything that we can imagine" (1:92; AT 11:30). But might God not create something that we *cannot* imagine? Has not Descartes stripped down his imagined universe so far that it could not possibly represent the real world?

He does manage to smuggle back in a couple of needed extra properties through a generous interpretation of "extension": "Let us conceive [matter] as a real, perfectly solid body which uniformly fills the entire length, breadth, and depth of this huge space" (1:91; AT 11:33). And "solidity" implies for him that the matter-extension cannot be "squeezed," that it also has the property of incompressibility.

At this point, imaginability might seem to be threatened: how is one to imagine an extension that, simply as extension, repels other extensions? Even more seriously, there is a missing property that his readers would be bound to notice. Quantity of matter in the later Scholastic tradition had been defined as the product of volume (or extension) and density. What has happened to density? Can one distinguish between two balls of the same size, one of lead and one of wood, say, in terms of their extension only, recalling that neither ball, in Descartes's universe, contains any vacua? Each, after all, must contain as much matter/extension as the other.

How is Descartes to persuade his readers that this sparse model can describe the real, the "old," world in all its diversity? How are extended shapes, even solid shapes, set in a diversity of motions by the Creator at the moment of cosmic origin, to make our universe? Descartes's answer: let me just *show* you! And there follows a virtuoso exercise of the imagination where the solid shapes grind one another down and three different "elements" emerge: tiny, small, and large "parts of matter." These gradually take on more or less orderly circular motions, the fastest-tiniest at the center of each swirl playing a major role in the sun and the other stars, the slowest-largest forced further out and coalescing into planets, some of which stray from one swirl to the next, becoming comets, others of which are swept along by larger planets and become moons. Though he does not say so, imagination plays an altogether crucial role in the retroductive method of his new science (McMullin 1996).

He next takes on the particular challenge for him of explaining weight, that is, "what the force is that unites all parts [of the Earth] and makes them all tend towards the center, each more or less according to the extent of its size and solidity." How is this to be explained in a universe without the property of gravity? His answer is confident: "This force . . . consists in nothing but the parts of the small heaven which surround [the Earth] turning much faster than [the Earth's] own parts about its center, and tending to move away with greater force from its center, and as a result pushing the parts of the Earth back towards its center." Pushing? But he realizes: "You may find this presents difficulties, given that I have just said that the most massive and most solid bodies [such as comets] tend to move outwards to the circumference of the heavens" (AT 11:73; Descartes 1995: 47).

There follows an extraordinarily complicated argument intended to show that, nevertheless, despite all appearances, the air above the falling stone has "the force to make the stone move downwards," that amount of air being "light when compared with the stone, but heavy when compared with the pure celestial matter above it" (AT 11:77;

Descartes 1995: 49). It is an ingenious, if somewhat strained, retroductive effort, relying entirely on its explanatory force for confirmation. It is not deductive: there are many other possible ways that one might try the difficult task of explaining planetary formation or falling motion on the Earth's surface, consistent with the slender explanatory resources of the universe Descartes envisioned. Nor is it predictive in a quantitative sense, allowing it to be epistemically tested other than by the persuasive appeal, such as it is, of the loosely specified mechanical model so confidently advanced by Descartes. The explanations he advances of specific natures are for the most part of this sort. The confirmation they offer to the models themselves is at level 1, but obviously of an extremely weak kind.

The mere fact that a moderately plausible model can be found might, however, be said to offer slightly stronger confirmation, still at level 1, to the principles from which the inquiry began: the controversial minimalist definition of matter as extension conjoined with the three laws of motion. That such a model can be found at all might be taken to strengthen the epistemic credentials of those principles, though of course as Descartes presents them, they are supposed in advance to be recognized as true on intuitive grounds, needing therefore no further confirmation. But he knew perfectly well that his reductive definition of matter, so sharply at odds with the tradition in natural philosophy and even with our ordinary experience of the differences of density between material bodies, could use a measure of confirmation beyond that afforded by the intuition-based considerations he had offered in its support.

Le Monde remained unpublished, but Descartes was, quite naturally, averse to allowing its insights to remain unappreciated by the broader public. In Part Five of the *Discourse* a few years later, he returned to his ambitious project of a mechanistic cosmogony, describing it this time only in outline, with none of the explanatory detail of the earlier work. In rhetorical terms, this lacked the explanatory appeal, such as it was, of *Le Monde*, but more than made up for that, perhaps, by conveying the impression that the explanatory accounts his cosmogonic claims would need in their support did in fact exist, even though he was not, for the moment, making them available. In this way he exempted them from critical scrutiny, for the time being at least.

What led him to attempt an account of the universe's origins, a project unthought of in the natural philosophies of his predecessors, and one risking theological censure besides? The answer is simple. It was prompted by the reductionist model to which his intuitionist starting point had committed him. If one can explain the complex properties of the world of today in terms of the sizes, shapes, and motions of imperceptible constituent particles, then it is tempting to carry the argument a step further (much as the ancient Atomists did) and assume that our familiar world could therefore have been built up gradually by the growing aggregations of these same particles. More of that assumption later.

Though the summary he offers in the *Discourse* is, on the whole, faithful to the cosmogony outlined in *Le Monde*, there are some differences of emphasis worth noting. There is still the insistence that this is a "new world" of his own invention, where God is supposed to create enough matter somewhere in this newly imagined space (but are not space and matter identical?) and to set this matter in motion "so as to form a chaos as confused as any the poets could invent," then "lending his regular concurrence to nature, leaving it to act according to the laws he established" (1:132; AT 6:42). As

before, these laws are said to be based on nothing other than the infinite perfections of God; they are such that “even if God created many worlds, there could not be any in which they fail to be observed.” But the identification of matter with extension is no longer made explicit: matter is just to be represented in such a way “that there is nothing, I think, which is clearer and more intelligible, with the exception of what has just been said about God and the soul” (1:132; AT 6:42).

It certainly sounds as though the world and its laws of motion that he envisages *have* to be of the kind he proposes. And the theme of necessity is to be extended further. He claims to have showed in *Le Monde* “how, in consequence of these laws, the greater part of the matter of this chaos *had* to become disposed . . . [so as] to resemble our heavens,” how “some of its parts *had* to form an earth, some [to form] planets and comets, and other [parts] a sun and fixed stars” (1:132–3; AT 6:43; emphasis added). He is presenting the cosmogony of *Le Monde* in necessitarian terms that are in no way warranted by the text as we now know it.

But then there is an apparent admission as he ends this part of the cosmogony: “I thought I had thereby said enough [in *Le Monde*] to show that for anything observed in the stars and heavens of our world, something similar *had* to appear, *or at least could appear*, in those of the world I was describing” (1:133; AT 6:43–4; emphasis added). There is all the difference in the world between “*had* to appear” and “*could appear*” in this context, one a necessary outcome, the other hypothetical, one involving deductive, the other retroductive, inference. Which was it to be? This was more and more clearly becoming the central epistemic issue for the Cartesian program, as the correspondence evoked by the appearance of the *Discourse* would soon bring out (Clarke 2006: ch. 6). The next sentence reverts to the unqualified deductive mode, speaking of the Earth: “how, although I had expressly supposed that God had put no gravity into the matter of which it was formed, still all its parts tended exactly towards its center.” But there follows a sequence of hypotheticals: “*could appear*,” “*could be formed*,” “*could come into being*” (1:133; AT 6:44). The ambivalence of the text at this point is surely significant.

But there is still another possibility that Descartes knew he had to take into account. God might, after all, have brought all of these structures into being in their finished form: the “much more likely” alternative. This was a prudent disclaimer in an age when biblical literalism was gaining ground, as the Church’s condemnation of the Copernican system had just made abundantly clear. But Descartes wanted his readers to appreciate the choice that had to be made here between an account of cosmic origins that relied extensively on Divine action outside the natural course, or an account that nowhere went beyond the ordinary bounds of nature. The implication was clear: God did not *need* to do it the hard way!

Discourse, Part Six

At this point, Descartes set aside the *Discourse*, coming back to it only after three years had passed. In the meantime he had had the opportunity to reflect on how his project in natural philosophy could be carried further. He was still confident about the cosmogony he had sketched earlier. But:

When I sought to descend to more particular things, I encountered such a variety that I did not think the human mind could possibly distinguish the forms or species of bodies that are on the earth from an infinity of others that might be here if it had been God's will to put them there. (1:45; AT 6:64)

He was embarking on a radically non-Aristotelian way of understanding the physical world, as we have already noted. The simplicity and *a priori* status of the starting point of the new physics, as well as the unmysterious character of the new explanatory machinery, were purchased, however, at the expense of a radical turn to the hypothetical. Eliminating the formal and final causes of the earlier tradition had left the single type of explanation remaining with an entirely new agenda, one in which imagination would play as large a role as the intuition from which the whole process was supposed to begin. Did Descartes himself realize the cost of the bargain he was offering? There are some indications that he did, and one of the clearest is to be found in the continuation of this text in the *Discourse*.

The query he is putting is cosmogonic in form: how is he to derive from his very general starting point the particular kinds of bodies that are to be found on Earth? The "only way," he says, is "to progress to the causes by way of the effects and to make use of many special observations/experiments [*expériences*]" (1:144; AT 6:64). So the inference, initially at least, moves from effects back to cause, guided by the constraints imposed by his principles on the choice of cause. Still, he assures his readers that he has never yet encountered a kind of object "which I could not explain quite easily by the principles I had discovered." But this is too easy: how is one to know that this is the *correct* explanation? And his celebrated response:

I must also admit that the power of nature is so ample and so vast, and those principles so simple and so general, that I notice hardly any particular effect of which I do not know at once that it can be deduced from the principles in many different ways; and my greatest difficulty is usually to discover in which of those ways it depends on them. I know of no other means to discover this than by seeking further observations whose outcomes vary according to which of these ways provides the correct explanation. (1:144; AT 6:64–5)

One would wish for a couple of concrete examples to bring out just how this would work: "deduced from the principles in many different ways" sounds like a single task but involves in fact several different ones. First he has to conjure up a configuration of (unobservable) material elements and their motions. Then he has to give some reason to believe that this configuration would mechanically produce the observed traits characteristic of the terrestrial kind under study (glass or steel, say, two examples from the later *Principles*). The inference here would be a typically retroductive one, relying on the confirmatory force (level 1) of the explanation offered. The main constraint laid on it would be that the chosen configuration would have to be consistent with the general principles of his natural philosophy. The reference to testing the proposed configuration by means of further observations makes this the closest that he comes to the hypothetico-deductive model of inference anywhere in his work.

What complicates matters even further, however, is the cosmogonic format he has chosen for his narrative. Not only must he hit upon a configuration that would explain

the properties of the body he is addressing, but he must also ask how that configuration would itself eventually come about from the operation of the laws of mechanics on the ensemble of particles alone, and in that sense be deducible from those principles. Were this to be taken into account it would on the one hand introduce a further source of hypothesis but on the other a further constraint, presumably, on the choice between the competing alternatives.

Descartes conflates the different sources of hypothesis as though only a single one were involved: "I notice hardly any particular effect of which I do not know at once that it can be deduced from the principles in many different ways." He makes it sound as though he is deducing an observed trait of glass, its transparency say, *directly* from the laws of motion and the definition of matter. But there is an intermediate stage, as his earlier comment about "progressing to the causes by way of the effects" makes clear. The "causes" among which he has first to choose are not the original principles. They are the postulated configurations that correspond to the particular kind of body he is investigating. In the earlier part of his inquiry, as he himself notes, the kinds of thing he was investigating: stars, planets, air, fire, are "the most common of all and the simplest" and are "consequently the easiest to know." No intermediate stage might therefore have seemed to him to be needed: he could define stars and the like by a simple observed property and then set out to try to show how something of that general sort would necessarily have to develop as the cosmogonic swirl progressed. But this will not work when the distinctive composition of the terrestrial kind under investigation, like glass, say, has itself to be discovered.

The procedure he proposes that would allow him to sort among the variety of possible causes is obviously addressed to the first part of this inferential process, not to the second cosmogonic, one. He goes on to emphasize that the observations that will be needed to carry this project through for the different sorts of bodies "are of such a kind and so numerous that neither my dexterity nor my income (were it even a thousand times greater than it is) could suffice for all of them" (1:144; AT 6:65). But how exactly these "observations" are to be planned, what they should look for, how they are to serve the goal assigned to them, he leaves in shadow. And there is little evidence in his later work of any sort of sustained effort of this sort.

As the *Discourse* ends, Descartes remarks that some of his readers may be shocked by his occasional use of the term *supposition* to describe claims he makes in the *Optics* and the *Meteorology*. But he asks for their patience and a closer look at what these works have actually accomplished:

For I take my reasonings to be so closely interconnected that just as the last are proved by the first, which are their causes, so the first are proved by the last which are their effects. It must not be supposed that I am here committing the fallacy that logicians call "arguing in a circle." For as experience makes most of these effects quite certain, the causes from which I deduce them serve not so much to prove them as to explain them; indeed, quite to the contrary, it is the causes which are proved by the effects. (1:150; AT 6:76)

This response echoes the discussions of *regressus* in Paduan commentaries on the *Posterior Analytics* of the previous century. The effects are what are known in

advance in these inferences. So the proposed causes more properly can be said to explain rather than to prove them. Whereas the effects *might* be said to “prove” the proposed causes, in the qualified sense, at least, of serving as a confirmation of some sort for them, Jacopo Zabarella had argued a century before Descartes that this ascent by way of “proof” from effect to cause, conjoined with a descent by way of explanation from cause to effect (recall the joint demonstrations of fact and of the reasoned fact in the *Posterior Analytics*), could, in favorable circumstances, count equivalently as a demonstration (i.e., confirmation at level 3). And this is, in effect, just what Descartes is here claiming.

His correspondents were not convinced. Responding to a query from Marin Mersenne, he wrote:

You ask whether I believe that what I have written about refraction is a demonstration. I believe it is, at least insofar as it is possible to provide a demonstration in this subject matter without having first demonstrated the principles of physics by means of metaphysics . . . and insofar as any other question in mechanics, or optics, or astronomy, or any subject which is not purely geometrical or arithmetical, has ever been demonstrated. But to demand geometrical demonstrations from me in something which depends on physics is to expect me to do the impossible. If one wishes to apply the term “demonstration” only to geometrical proofs, then one must say that Archimedes never demonstrated anything in mechanics, nor Witelo in optics, nor Ptolemy in astronomy. For in these disciplines one is satisfied if the authors presuppose certain things which are not manifestly incompatible with experience and then speak consistently, without committing any logical mistakes, even if their assumptions are not exactly true. (Descartes to Mersenne, May 27, 1638; Descartes 1999: 73; 3:103; AT 2:141–2)

Demonstration in the strict sense is confined to the mathematics used in these fields, but Descartes is appealing to a broader usage of the term which would allow it to be applied to a science yielding only approximation because of an element of idealization in fitting the original lawlike formalisms to the observational data. To settle for this in his own work would already be to yield ground. But even this would still be to claim much too much. In the fields named, the traditional “mixed sciences,” the pioneers did not have to press beyond the observable regularities, finding it possible to reduce these to mathematical ordering without having to advance an explanatory theory about the causal mechanisms involved. Whereas in his own work on refraction, as he describes it in this same passage, he makes the assumption that light “is transmitted by means of a very subtle fluid which is present in the pores of transparent bodies.” The analogy he claims between the mixed sciences and his own work fails at this point. His is retroductive, theirs for the most part is not. Theirs is admittedly only approximate in application, but his explanation can turn out to be quite false.

A few months later, Descartes tries again. In response to an objection from Jean-Baptiste Morin, he replies that it would, indeed, be circular to prove effects by a cause and then prove this cause by the same effects. But, he says, what he is doing is different: he is *explaining* effects by a cause and then proving the cause by the effects. There is, he insists, “a big difference between proving and explaining” (Descartes to Morin, July 13,

1638; Descartes 1999: 75–7; AT 2:198; CSM 3:106). And, of course, he is right about that. Explanation can without circularity be said to “prove,” but only in a weaker level 1 sense of “confirm.”

Descartes, naturally, wants something more than confirmation in this weaker sense: he wants *real* proof, that is, one affording certainty. To Morin he continues:

... it is not so easy to adjust one and the same cause to many different effects if it is not the real cause from which they result. There are often even some effects such that, by proposing one cause from which they can be deduced clearly, this is enough to prove that it is their true cause. I claim that all those I spoke about are of this kind.

And he adds that his “single hypothesis” about the composition of bodies has been able, as cause, to explain a multitude of phenomena (“salt, the winds, the clouds, snow”), and hopes that this will be enough to convince “those who are not too prejudiced that the effects that I explain have no other causes apart from those from which I deduced them, even if I defer providing a demonstration to some other place.” Notice once again the persistent ambiguity. A better case can be made for claiming that his overall success in formulating a multitude of specific explanations confirms (at level 1) the “single hypothesis” about the composition of bodies that enabled him to carry this out. But to what extent are the explanations proposed for each phenomenon confirmed: the clouds, the snow, and the rest? In these earlier works, Descartes slipped easily from one issue to the other. But this ambiguity ultimately became too obvious to be glossed over when he turned in his new work to the profusion of specific natures his principles purported to explain.

The Principles of Philosophy

Up to this point, Descartes had found ways of excusing the evident incompleteness of the explanations he was offering: “I defer demonstration to another place”; “I did not want to bring these matters too much into the open” (1:132; AT 6:42); “I have deliberately avoided carrying out these deductions in order to prevent certain ingenious persons from taking the opportunity to construct, on what they believe to be my principles, some extravagant philosophy for which I shall be blamed” (1:150; AT 6:76). And so on. But when the long-promised summation of his work, *The Principles of Philosophy*, was finally completed in 1644, this way of deflecting questions was no longer open. Whether it was only at this point, indeed, that he realized that his ambitious program could not be carried through in the deductivist terms in which it had been conceived (Garber 1978), or whether he had come to that realization prior to completing the *Discourse*, the more usual view (Olscamp 1965; Laudan 1981), it is at any rate clear that, reluctantly and with much foot-dragging, he does make that concession when opening his account of natural philosophy in Part Three of the *Principles*.

Here the distinction obtrudes more and more between confirming the basic principles of his natural philosophy and confirming the detailed particle-configurations meant to explain the properties of terrestrial bodies:

Suppose, then, that we use only principles which we see to be utterly evident, and that all our subsequent deductions follow by mathematical reasoning: if it turns out that the results of such deductions agree accurately with all natural phenomena, we would seem to be doing God an injustice if we suspected that the causal explanations discovered in this way were false. (1:255; AT 8A:99)

This is still ambiguous. The principles are taken to be self-evident and it sounds as though the explanatory success of the constructions he is offering is sufficient to establish the intermediate causes, the material configurations, that are part of these constructions. But he goes on a few paragraphs later to make it clear that this latter is not the case. What he has established, he says, are the *general* features, the basic principles, of his natural philosophy, notably that "all the bodies in the universe are composed of one and the same matter, which is divisible into indefinitely many parts . . . which move in different directions and have a sort of circular motion; moreover, the same quantity of motion is always preserved." However:

. . . we cannot determine by reason alone how big these pieces of matter are, or how fast they move, or what kinds of circle they describe. Since there are countless different configurations which God might have instituted here, *expérience* alone must teach us what configurations he actually selected in preference to the rest. We are thus free to make any assumption on these matters with the sole proviso that all the consequences of our assumptions must agree with our *expérience*. (1:256–7; AT 8A:100; AT 9B:124)

This is unambiguous. Already hinted at in Part Six of the *Discourse*, it concedes that the extraordinary variety of configurations described in Parts Three and Four, taken together perhaps the most dazzling example of imaginative construction in the entire history of science, must be regarded as hypothetical, open to alternatives, to be discriminated among not by appeal to basic principles but to relative fit with experience/experiment. The form of inference here is retrodution not deduction, offering modest confirmation at level 1 at best.

Even the briefest glance at the explanations offered for the properties of natural bodies would show how difficult it would have been, however, to devise experiments or observations that would discriminate between the alternatives. When explaining the nature of the sun, for example, Descartes attributes two different sorts of motion to particles of the first element, one rectilinear and one circular. But they expend the greater part of their "agitation" in constantly changing shape "so that they exactly fill all the narrow spaces through which they pass." They are thus flexible, yet another property. But still, the particles of this first-element matter within the sun retain enough force to "unite for that action in which we previously showed that light consists" (Descartes 1983: 125–6; AT 8:131).

What shape do these particles have? "Of course, they must be triangular in cross-section because they frequently pass through those narrow triangular spaces which are created when three globules of the second element touch." Further, we can "conceive of them as small fluted cylinders with three grooves (or channels) which are twisted like the shell of a snail. This enables them to pass in a twisting motion through the little spaces" (Descartes 1983: 133–4; AT 8:144–5). The number of grooves, he argues at some length, must be exactly three. And the twist of the grooves has to be in

opposite directions, depending on which pole of the heavens the particles approach from. Later, the supposition that the pores “which accept the Northern particles do not admit the Southern ones” plays a major role in his discussion of magnetism. (For other examples of imaginative explanatory models, see, for example, the particles with “arm-like branches” that enable bodies to cohere, or the particles with “hooks or barbs” that explain how steel is tempered: Descartes 1983: 196, 248; AT 8:220, 282).

This small sample is enough to illustrate the near-impossibility of finding the sorts of observations or experiments that would discriminate between elaborate models of this sort and other equally suggestive explanatory constructions. Once again Descartes is issuing a promissory note, but this time it is with an acknowledgment that the configurations on which the explanatory burden of his science mainly rests cannot, in practice, be arrived at by deduction from above, but can only (at best) be established *a posteriori* from below.

To what extent might this qualify his reasoning as the sort of hypothetico-deductive inference that recent philosophers of science, especially those in the positivist tradition, have extolled? The answer must be: hardly at all. It is true that Descartes is forced in the end to allow the hypothetical character of his discussions of the underlying structures of physical bodies; true too that he allows in a general way the role of experience in deciding between rival explanatory alternatives. But that is where the resemblance ends. The explanations he offers rely in the first place on the epistemic priority of clear and distinct ideas to certify the explanatory apparatus employed: bodies reduced to extensions and all the rest. This the exponents of HD method would never allow.

Even more significant, tight predictive links are lacking at both the levels we have been discussing: from principles to configurations and from configurations to observed properties. One cannot really predict from the principles alone that matter will dispose itself into starlike bodies, any more than one could actually derive the host of magnetic phenomena that Descartes lines up for explanation from the properties and motions of grooved particles. All one has to go on here is imaginative suggestion which the readers are expected to fill in for themselves.

Finally, his treatment of potentially falsifying evidence from experience can be cavalier (Sakelleriadis 1982). This is particularly clear in the case of the seven rules of impact propounded in Part Two of the *Principles* (Descartes 1983: 64–9; AT 8:68–70). Several of the laws appear to run contrary to our ordinary experience of impact, as a number of Descartes’s correspondents were quick to point out. His defense was that before one could judge whether a particular instance of impact obeyed these rules or not, one would have to be able to calculate the effects on these bodies of the multiplicity of invisible matter-particles with which they are surrounded (Descartes 1983: 69; AT 8:70). In practice, of course, this would render the rules next to unfalsifiable. On another issue, responding to Beeckman and Mersenne who reported observational data flatly contradicting his account of pendulum motion, he wrote that he felt entitled to ignore such data: “even if [Beeckman] could make thousands of experiments to find the [pendulum acceleration] more exactly, nevertheless as long as they cannot be confirmed by reason . . . I do not believe that I have to take the trouble to perform them myself” (Descartes to Mersenne, December 18, 1629; AT 1:100).

His point is that “explanation by reason” takes priority over observation in cases like this. Unless apparently falsifying data can be derived from a rival set of mechanical

laws, themselves supported by "reason," they can be discounted as due to the ever-present, uncontrollable effects of hidden mechanical agencies. There is no suggestion here of modifying the original hypothesis or of formulating alternatives, of respecting the challenge of apparently refuting experiments and devising new experimental strategies. The authority of "reason" is final. Though hypothesis is omnipresent in the explanations offered of the properties of physical bodies, there is little attempt to test these explanations by drawing further consequences and checking to discover whether or not they are verified. For all of these reasons it is clear that what he offers is not at all what is usually meant by "hypothetico-deductive" inference.

Summing-Up

The final paragraphs of the *Principles* (1:285–91; AT 8A:323–9) aim to summarize what he has achieved in natural philosophy, beginning with the claim: "There is no phenomenon which has been overlooked in this treatise." He recognizes that his entire system of explanation depends on an appeal to unobservable particles and so he presents a commonsense argument based on the growth of living things for the existence of such particles, while being careful to distinguish his system from the atomism of Democritus. But then: "In view of the fact that I assign determinate shapes, sizes, and motions to the imperceptible particles of bodies just as if I had seen them, some people may be led to ask how I know what these particles are like" (1:288; AT 8A; 325–6).

There follows a somewhat idealized account of the procedural order he has followed. Attributing to such particles only such properties (shape, size, etc.) as would afford clear and distinct ideas and calling on certain "best-known" principles "knowledge of which is naturally implanted in our minds," he supposedly deduced first how particles of different shapes, sizes, and motions would in fact interact "and what observable effects would result from such interactions." Only then, he says, did he observe just such effects constituting the properties of observable bodies, allowing him to infer that these properties could be explained, and indeed *only* be explained, by recourse to the relevant configurations of imperceptible particles. This would, if successful, make a claim to level 3 confirmation ("seemed impossible to think of any other explanation for them"). But the familiar ambiguity returns: does this level of confirmation relate to the *specific* configurations proposed to explain the observed properties or only to the employment of configurations of this sort generally?

The heading of the following paragraph would bear out the latter interpretation: "With regard to the things which cannot be perceived by the senses, it is enough to explain their possible nature, even though their actual nature may be different." And the text: "Although this method may enable us to understand how all the things in nature could have arisen, it should not therefore be inferred that they were in fact made that way" (1: 289; AT 1:327). To reinforce his point, he calls on an analogy that would delight recent exponents of the underdetermination of theory by observation. Two clocks operated by quite different mechanisms might look just the same from the outside. One cannot infer with certainty from a clock's outward appearance to the mechanism inside.

And then an echo of a theme with origins in fourteenth-century voluntarist theology: "So the supreme craftsman of the real world could have produced all we see in several different ways." Once one makes an appeal to unobservable causes, it is difficult to avoid such a conclusion, whether couched logically in terms of underdetermination or theologically in terms of what the Creator might bring about at the unobservable level to which one is appealing. Finally, making the best of it: "I shall think I have achieved enough provided only that what I have written is such as to correspond accurately with all the phenomena of nature. This will indeed be sufficient for application to ordinary life." A far cry from the confident promise of yore . . .

But all was not lost:

If people look at the many properties relating to magnetism, fire, and the fabric of the entire world, which I have deduced in this book from just a few principles, then, even if they think that my assumption of these principles was arbitrary and groundless, they will still perhaps acknowledge that it would hardly have been possible for so many items to fit into a coherent pattern if the original principles had been false. (1:290; AT 8A:328)

So, even if he has to give up on achieving certainty in regard to the specifics of the particle configurations, settling for (problematic) level 1 confirmation only, he can still promise "more than moral certainty," i.e., level 3 confirmation, in regard to the starting principles. Among those principles, some enjoy "absolute certainty" because of their prior metaphysical foundation in the goodness of God. But others can use further confirmation, confirmation afforded, it appears, by the explanatory power the *Principles* have shown they possess. The principles he has in mind here are evidently those based on the norm of clear and distinct ideas, primarily the reduction of matter to geometrically tractable extension, the most controversial feature of his system.

Though *a priori* elements remain, retroduction at this point has largely supplanted deduction as the major form of confirmation, invoking explanatory power that proceeds from below rather than from above. The general principles regarding the nature of material bodies rely on two very different sorts of confirmation: one is still the intuitive route through God's immutability or through clear and distinct ideas, but the other is retroductive, through an appeal to the multiplicity of particular explanations that these principles have enabled the author to construct. And this appeal is so persuasive, he suggests, as to show these principles to be the only possible explanation, confirming them therefore at level 3. As for the multitude of particle configurations that fill the pages of the *Principles*, they can only in contrast call for level 1 confirmation at best, by appealing to the beguiling ingenuity of the accompanying explanation-sketches.

Level 1 at best . . . This was not yet the disciplined form of explanation that would gradually take shape in the years that followed (McMullin 2006). Boyle would only a few years later set down ten requisites that an explanation should satisfy for it to plausibly confirm its attendant hypothesis; it seems very likely that he had the shortcomings of Descartes's explanations in mind. But it would take two centuries more for exploration to begin in earnest of the microworld that Descartes had so optimistically tried to chart. By then, confirmation of hypothetical microstructure by means of the

explanation it offered had finally proved itself through its ability to open up in relatively secure fashion new worlds that Descartes had pointed towards but was never able to reach.

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Chapter 7

Descartes and Mathematics

PAOLO MANCOSU

Introduction

Descartes is one of the few geniuses in history who was able to bequeath epoch-making contributions to philosophy and to mathematics at the same time. In addition, his contributions to these areas are not independent but rather feed on each other. The mutual relation of philosophy and mathematics is reflected in the interpretation of analysis and synthesis in both mathematics and philosophy; the conception of proof; the claim that physics is nothing but geometry; the theory of eternal truths; the conception of infinity; his ontological and epistemological views on extension and number; the role of sense, imagination, and reason in mathematics and its relation to his account of human nature; the transition from a mathematical paradigm of certainty to the claim that mathematics needs to be founded on metaphysics and the role of skepticism in this transition; the development of the method and the notion of *mathesis universalis*; and the structure of the *Geometry*.

Rather than try to touch upon all these topics, I will focus in greater depth on the last two: the development of method and the structure of the *Geometry*, because this will give an insight into what, using Brunschwig's happy expression, could be called the *philosophie mathématique* of Descartes, and it will help us to understand the grounds for his foundational choices.

The impact of mathematics on Descartes's philosophy is intimately tied to his critical reflection on the mathematical practice of his day and to his own mature mathematical practice. Out of a mixture of admiration for the certainty of mathematics and dissatisfaction with the state of past and current mathematics, Descartes was led to the idea of an "entirely new science." Mathematics served as the model for a more general method for arriving at certain knowledge in any field whatsoever, a method presented in the *Rules* and the *Discourse on Method* and applied in the *Geometry*. The goal here will be to follow the dialectic between philosophy and mathematics in Descartes's thought up to 1637. This cut-off point is a natural one, as Descartes's subsequent philosophical projects are not as closely related to issues of mathematical practice. This is not to say that Descartes completely stopped working in mathematics after this date, but rather to emphasize that his philosophical engagement with mathematics became less closely tied to ongoing mathematical research and can be understood independently of it.

Descartes's Early Engagement With Mathematics (up to 1623)

Although we know much about the mathematical culture of the late sixteenth and the early seventeenth centuries, specific information about Descartes's mathematical education at La Flèche remains elusive. (For detailed accounts of Descartes's scientific career, see Shea 1991; Gaukroger 1995; Sasaki 2003.) There is evidence that he learned his algebra from Clavius's 1608 *Algebra* (AT 4:731). (On Jesuit mathematical culture, see Romano 1999.) In the *Discourse on Method* (1637), Descartes says that in his school days he "delighted in mathematics, because of the certainty and self-evidence of its reasoning" (1:114; AT 6:7). In addition, he pointed out the relevance of mathematics to his later projects:

When I was younger, my philosophical studies had included some logic, and my mathematical studies some geometrical analysis and algebra. These three arts or sciences, it seemed, ought to contribute something to my plan. (1:119; AT 6:17)

In the earlier *Rules*, however, Descartes expressed some dissatisfaction with arithmetic and geometry; we will soon see why. Immediately after his departure from La Flèche, Descartes did not seem to have pursued any mathematics. His return to mathematical studies seems to have been occasioned by his meeting Isaac Beeckman after he settled in Holland in the summer of 1618. A letter to Beekman, dated March 26, 1619, is especially important for us:

I have discovered four remarkable and completely new demonstrations. The first has to do with the famous problem of dividing an angle into any number of equal parts. The other three have to do with three sorts of cubic equations . . . Let me be quite open with you about my project. What I want to produce is not something like Lull's *Ars Brevis*, but rather a completely new science, which would provide a general solution of all possible problems involving any sort of quantity, whether continuous or discrete, each according to its nature. . . . So I hope I shall be able to demonstrate that certain problems involving continuous quantities can be solved by means of straight lines or circles only, while others can be solved only by means of curves produced by a single motion, such as the curves that can be drawn with the new compasses (in my view these are just as exact and geometrical as those drawn with ordinary compasses), and others still can be solved only by means of curves generated by distinct independent motions, which are surely only imaginary, such as the notorious quadratic curve [quadratrix]. There is, I think, no imaginable problem which cannot be solved, at any rate by such lines as these. I am hoping to demonstrate what sorts of problems can be solved exclusively in this or that way, so that almost nothing in geometry will remain to be discovered. (3:2–3; AT 10:154–7)

Descartes actually introduced a variety of compasses (AT 10:212–48), but here I will describe only the mesolabe compass, explaining how Descartes used it to solve one specific cubic equation. Since this compass also plays a central role in the *Geometry* of 1637, I will simply provide a description using the drawing from the latter text. The compass can be thought of as a machine which consists of several rulers linked together (figure 7.1).

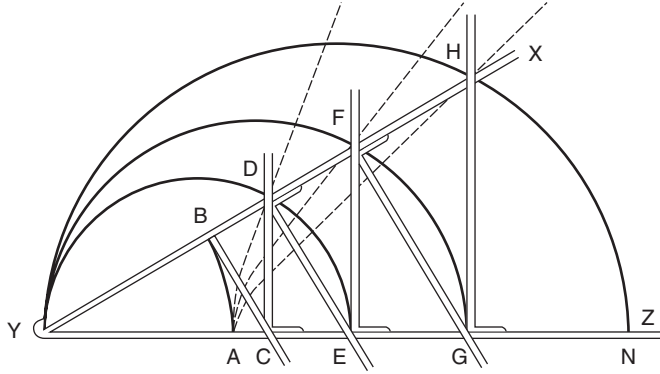


Figure 7.1

Consider YZ to be fixed and Y to be a pivot which allows YX to rotate. Perpendicular to YX we have a fixed ruler BC and sliding rulers DE, FG, etc. Perpendicular to Y we have sliding rulers CD, EF, GH, and so on. In the initial position YX overlaps with YZ. As we let YZ rotate counterclockwise, the fixed ruler BC pushes the sliding ruler CD, which in turn pushes the sliding rulers DE, and so on. Through the opening of the compass, the moving points B, D, F, H, and so on, describe curves. In the *Geometry*, Descartes will emphasize that this device displays a kind of generation of curves by regulated motions. In essence the compass is a device for constructing continuous proportions. Notice that by simple properties of triangles, $YB : YC = YC : YD = YD : YE = YE : YF = YF : YG$, etc. Letting $YA = YB = 1$ and $YC = x$, we obtain $1 : x = x : x^2 = x^2 : x^3 = x^3 : x^4 = x^4 : x^5$, etc.

Let us now consider how one can find a solution to the cubic equation $x^3 = x + 2$, one of the several cases treated by Descartes. The problem can be solved by using the mesolabe compass to construct a length of size x . On account of the construction of the compass we have

$$YB/YC = YC/YD = YD/YE = YE/YF$$

This yields

$$YE = (YD)^2/YC = (YC)^3/(YB)^2$$

Since $CE = YE - YC$, using the above we get

$$CE = [(YC)^3/(YB)^2] - YC$$

Letting $YB = 1$ and $YC = x$, we obtain $CE = x^3 - x$ or equivalently $x^3 = x + CE$. Thus all we need to do to solve our cubic equation is to open the compass in such a way that CE is twice 1 and YC will give us a positive real root for the equation $x^3 = x + 2$.

According to Descartes, the mesolabe compass is just as geometrical as the ordinary one used to draw circles. This helps to explain why Descartes wrote to Beeckman that

he is looking for “an entirely new science” which will treat uniformly the two major areas in which mathematics was traditionally partitioned: arithmetic (dealing with discrete quantities) and geometry (dealing with continuous quantities). He claims that all such problems will be solved by the new science. In the case of geometry one will show that certain problems can be solved by ruler and (ordinary) compass, while others require more complex curves (generated by the new compasses), and still others require special curves, such as the quadratrix. (In the *Geometry* the quadratrix will be excluded from the realm of geometry, for reasons we will discuss fully later.) The new science would also show that any given class of problems cannot be solved by using simpler techniques than its complexity allows. With some modifications, Descartes carried out much of this strikingly ambitious program in the later *Geometry* of 1637.

Thus, by the early 1620s, Descartes had developed an ambitious program for mathematics and had begun to see what tools might be needed to carry it out. But most importantly, he began reflecting on the enterprise and distilling out of it some of his central philosophical insights. These efforts resulted in his *Rules for the Direction of the Mind*, to which we now turn.

Rules for the Direction of the Mind

Although the dating of the text of the *Rules* has been the subject of heated debate, scholars agree that it was written before 1629. The *Rules* is an unfinished text, and Descartes never published it. Originally it was supposed to consist of three parts each containing twelve rules. (For detailed studies of the *Rules*, see Beck 1952; Marion 1975; Sepper 1996.) Descartes begins the *Rules* by emphasizing the importance of focusing not on specific sciences but rather on finding rules that can be applied to any objects of knowledge whatever. The aim is to arrive at *scientia*, i.e., “certain and evident cognition.” Many scholars have pointed out that Scholastics such as Suárez characterized *scientia* by means of “certainty and evidence” (Descartes 1977: 102), but these scholars have failed to note that such Scholastics did not regard these features as sufficient to characterize *scientia*. In particular, *scientia* must also provide the cause or the reason why. (See, for example, Suárez 1597: I.6.6: “knowledge is to know by causes with evidence and certainty.”) By contrast, Descartes’s characterization of *scientia* does not put any emphasis on causes, and we will see below that this has consequences for his account of the certainty of mathematics.

In Rule 2 Descartes disqualifies probable opinion and tells us that “we should attend only to those objects of which our mind seems capable of having certain and indubitable cognition” (1:10; AT 10:362). Unfortunately, “among the sciences so far discovered,” only arithmetic and geometry meet the high standards set by Descartes, because “they alone are concerned with an object so pure and simple that they make no assumptions that experience might render uncertain; they consist entirely in deducing conclusions by means of rational arguments” (1:12; AT 10:364–5). The conclusion Descartes draws is not that one should limit oneself to arithmetic and geometry, but rather that one should concern oneself “only with objects which admit of as much certainty as the demonstration of arithmetic and geometry” (1:13; AT 10:366).

One of the major debates in Renaissance and seventeenth-century philosophy of mathematics, known as the *Quaestio de certitudine mathematicarum*, was concerned with the certainty of mathematics and its grounds. A tradition going back to Aristotle had attributed this certainty to the fact that mathematics makes use of the best type of syllogism, known as scientific syllogism. Such a syllogism is characterized, among other things, by the fact that the middle term of the syllogism provides a causal link between the major and the minor term. In the case of mathematics it was thought that formal and material causes played the role of the causal link. In 1547 Alessandro Piccolomini challenged such an account of the certainty of mathematics by claiming that mathematics does not have scientific syllogisms. Instead, he ascribed the certainty of mathematics to the special nature of its objects. The Jesuit Benito Pereira also attacked mathematics for not having scientific status, on the grounds that in mathematics we lack “knowledge of a thing through the cause on account of which the thing is” (Pereira 1576: 24). This was to unleash a major debate which we do not need to revisit here. (For an extended discussion and references, see Mancosu 1996: ch. 1.) By defining *scientia* in terms of certainty and evidence without appealing to causality, and by explaining the certainty of mathematics in terms of the purity and simplicity of its objects, Descartes probably knew that he was taking a side in this debate.

In Rule 3 Descartes tells us that knowledge can be gained only by clear and evident intuition or by deduction. In passing, he makes a remark which is quite revealing of his image of mathematical knowledge:

Even though we know other people’s demonstrations by heart, we shall never become mathematicians if we lack the intellectual aptitude to solve any given problem. And even though we have read all the arguments of Plato and Aristotle, we shall never become philosophers if we are unable to make a sound judgment on matters which come up for discussion; in this case what we would seem to have learned would not be science but history. (1:13; AT 10:367)

Thus, to have knowledge of mathematics, it is not enough to rehearse the contents of the mathematics that others have found. Rather, knowledge requires a special disposition of the mind which allows one to *solve* mathematical problems and thus *discover* mathematical truths. One of Descartes’s major aims was to distill out of his mathematical activities certain rules that would show how to go about being such a creative thinker about mathematics and, perhaps, about everything else that can be the object of knowledge.

Let’s go back to intuition and deduction. Descartes defines intuition as “the conception of a clear and attentive mind, which is so easy and distinct that there can be no room for doubt” (1:14; AT 10:368). Intuition provides us with immediate self-evidence of certain truths:

Thus everyone can mentally intuit that he exists, that he is thinking, that a triangle is bounded by just three lines, and a sphere by a single surface, and the like. (*Ibid.*)

Descartes lists non-mathematical truths as having the same self-evidence as mathematical ones, suggesting that the clearness and evidence characterizing mathematics

can be found in other domains. In the later *Meditations* he will go further and claim that there are metaphysical truths that are more certain and evident than the mathematical ones.

Deduction is characterized as a “continuous and uninterrupted movement of thought in which each individual proposition is clearly intuited” (1:25; AT 10:370). Through chains of reasoning starting from propositions known with certainty, deduction allows us to obtain conclusions which are certain, if not always as self-evident as those provided by intuition.

We thus arrive at Rule 4 (“We need a method if we are to investigate the truth of things”), which plays a pivotal role in the *Rules*, because it introduces the need for a “method” and articulates the role played by mathematics in the constitution of the method. In his commentary to Rule 4, Descartes chastises all those (“every chemist, most geometers, and many philosophers”) who proceed at random in their investigations. Claiming that it would be better not to investigate anything than to do so without method, he defines method as follows:

By “a method” I mean reliable rules which are easy to apply, and such that if one follows them exactly, one will never take what is false to be true or fruitlessly expend one’s mental efforts, but will gradually and constantly increase one’s knowledge [*scientia*] till one arrives at a true understanding of everything within one’s capacity. (1:16; AT 10:371–2)

The method, we could say, is “sound” and “complete.” It will never lead us to something false and it will allow us to reach every truth that is knowable by us. Descartes claims to find traces of such method in contemporary developments in algebra and in Greek geometrical analysis (1:17; AT:373). (On this tradition, see Panza 1997.) However, he does not regard these disciplines as unqualified examples of epistemologically accomplished sciences. Rather, arithmetic/algebra and geometry provide especially perspicuous examples through which one can perceive the path to a different discipline that “should contain the primary rudiments of human reason and extend to the discovery of truths in any field whatever” (1:17; AT 10:374).

Descartes believes that the work of previous mathematical writers is unsatisfactory on two *explanatory* grounds. First, although they show that certain propositions are true they cannot say why they are true. Moreover, their demonstrations do not show how the result could be found. However, Descartes is convinced that in ancient times certain authors (including Pappus and Diophantus) were familiar with “a kind of mathematics quite different from the one prevailing today” (1:18; AT 10:376), one that they hid from posterity. He views contemporary algebra, apart from some removable defects, as in part a rediscovery of the methods of Pappus and Diophantus.

As he reflected on mathematics, Descartes came to believe he could explain why it includes not only arithmetic and geometry, but also areas such as astronomy, music, mechanics, and optics. (Indeed, during Descartes’s time these sciences were normally classified as mixed, or intermediate, mathematical sciences.) Mathematics is concerned with “order and measure,” he claims, and there must be a *mathesis universalis* which

contains the most abstract principles of all those sciences which fall under the classification of mathematics:

I came to see that the exclusive concern of mathematics is with questions of order or measure and that it is irrelevant whether the measure in question involves numbers, shapes, stars, sounds, or any other object whatever. This made me realize that there must be a general science which explains all the questions that can be raised concerning order and measure irrespective of the subject-matter, and that this science should be termed *mathesis universalis* – a venerable term with a well-established meaning – for it covers everything that entitles these other sciences to be called branches of mathematics. (1:19; AT 10:377–8)

Rule 4 is the only place in the Cartesian corpus where Descartes speaks of *mathesis universalis*, and the issue of *mathesis universalis* has occupied generations of Cartesian scholars. (Concerning scholarship on this point, see Crapulli 1969; Schuster 1980; Sasaki 2003; Rabouin 2005.) This definition of mathematics as the science of “order and measure” is novel with respect to the previous mathematical tradition, where mathematics is often characterized as having *quantitas* as its object, and it is not clear how to understand what a science of “order or measure” would consist in. It is fairly obvious that general proportion theory would be included in it, as such a theory can treat problems of measure for numbers, figures, sounds, motions, etc. It is harder to say what problems of “order” meant for Descartes. Descartes often emphasizes the importance of classifying the complexity of problems according to their order of complexity. (Recall the letter to Beeckman describing his program for a completely new science in 1619.) Moreover, he insists on the importance of establishing an order when investigating what steps are needed for the solution of a problem. If this is what “order” consists in, it is obvious that this component of *mathesis universalis* is unlike the proportion theory: it is not an already developed part of mathematics and could perhaps be seen as part of the “heuristics” of mathematics.

The need to understand better the notion of *mathesis universalis* has led scholars to study the two different traditions of thought that played a role in the constitution of the idea. The first originates from the rediscovery of Proclus in the sixteenth century (edited in Greek in 1533 and translated into Latin in 1560), who, in his commentary to Euclid’s *Elements*, describes a common science prior to all the mathematical disciplines and seems to identify it with a higher science, almost a general ontology. The second tradition, exemplified by Adrian van Roomen’s *Apologia pro Archimede* (1597), characterizes *mathesis universalis* as a mathematical discipline. Frustratingly, Descartes does not explicitly indicate his sources and thus we cannot ascribe to him with certainty knowledge of any one particular text of those that collectively made up the traditional reflection on *mathesis universalis*.

We have seen how the articulation of the rules of the method in the *Rules*, whatever the details of this method are, originates from a reflection on the science of mathematics. In addition, when in the later rules Descartes spells out his method in more detail, he does so by relying on the model of algebraic analysis. We will later see an example of how algebraic analysis works by using one of Descartes’s most mature applications of it, the solution of Pappus’ problem in the *Geometry*.

Discourse on the Method

Descartes's first publication was *Discourse on the Method of rightly conducting one's reason and seeking the truth in the sciences, and in addition the Optics, the Metereology and the Geometry, which are essays in this Method*, published in French in 1637. Once again, we will pursue here only the matters more directly related to the influential role of mathematics in the formation of the method. In Part Two of the *Discourse*, Descartes remarks that logic, the analysis of the ancients, and algebra ought to contribute something to the method, but he criticizes syllogistic logic as ineffective when it comes to finding truths. It is useful only in explaining those truths that have already been found. Then he criticizes the actual state of geometry and algebra:

As to the analysis of the ancients and the algebra of the moderns, they cover only highly abstract matters, which seem to have no use. Moreover the former is so closely tied to the examination of figures that it cannot exercise the intellect without greatly tiring the imagination; and the latter is so confined to certain rules and symbols that the end result is a confused and obscure art which encumbers the mind, than a science which cultivates it. (1:119–20; AT 6:17–18)

Despite the shortcomings of logic, analysis, and algebra, Descartes's project was to try to extract from them rules for the method. In Part Two of the *Discourse* he lists his famous four rules:

The first was never to accept anything as true if I did not have evident knowledge of its truth . . .

The second, to divide each of the difficulties I examined into as many parts as possible and as many as may be required in order to resolve them better.

The third, to direct my thoughts in an orderly manner, by beginning with the simplest and most easily known objects in order to ascend little by little, step by step, to knowledge of the most complex, and by supposing some order even among objects that have no natural order of precedence.

And the last, throughout to make enumerations so complete, and reviews so comprehensive, that I could be sure of leaving nothing out. (1:120; AT 6:18–19)

The long list of rules presented in the *Rules* is here summarized in four easy rules. However, Descartes was aware that these rules would be of no practical help for someone attempting to solve a problem. He wrote to Mersenne in February 1637 that he had not intended to “teach the method but only to talk about it,” for the method consists “much more in practice than in theory” (3:53; AT 1:349). The practice of the method was embodied in the *Essays* published with the *Discourse*, and we will soon turn to the *Geometry*, one of the three *Essays*. But first let us consider Descartes's narration in the *Discourse* of the role mathematics played in the discovery of the method.

What Descartes gives us at this point is a recounting of his thought processes that is closely related to the narration in the *Rules*. Impressed by the demonstrations of geometers, “those long chains composed of very simple and easy reasonings,” he supposed that all things that can be an object of human knowledge are interconnected in the same way. For him, the study of “certain and evident reasonings” found in

mathematics aimed not at a detailed knowledge of the mathematical sciences but rather at abstracting what is common to all of them:

For I saw that, despite the diversity of their objects, they agree in considering nothing but the various relations or proportions that hold between these objects. And so I thought it best to examine only such proportions in general. (1:120–1; AT 6:19–20)

The passage is obviously related to the topic of *mathesis universalis*, though the term is not used in the *Discourse*. In any case, Descartes believes that these proportions, although most easily known in geometry and algebra, could be applied to many other subjects, mathematical and non-mathematical as well. But what he takes from the two specific sciences of geometry and algebra is the idea of representing these proportions through lines and designating them by the briefest possible symbols. In this way he claims to have taken “all that is best in geometrical analysis and algebra, using the one to correct the other” (1:121; AT 6:20). Descartes expresses then his full confidence in the rules he has followed; he thinks they are sufficient to solve all the problems that can be posed in algebra and geometry. Moreover, although he claims that the method can be extended to other non-mathematical problems, he points out that this will require a previous investigation of certain metaphysical principles upon which the principles of various sciences depend. The problems related to this extension go well beyond the simple problem of applying proportion theory to non-mathematical subjects.

This completes then the complex path that led from Descartes’s reflection on mathematics to a method for investigating truths in all subjects which admit of human knowledge. Descartes abstracts from mathematical practice his original characterization of mathematics; from that he distills rules which he then uses to characterize the method. Because the method applies to both mathematical and non-mathematical subjects, and because the rules are so general and vague, it is only by detailed examination of the *Essays* that we can hope to see the method at work. We thus move to the *Geometry*.

The *Geometry* was published in 1637 as an appendix to the *Discourse on Method*. (For a detailed study and further references, see Bos 2001.) It consists of three books, but I will restrict myself to some aspects of Books I and II. In Book I, we will examine the definition of the geometrical operations on line segments and Descartes’s solution to Pappus’ problem. Both topics are essential for an understanding of Cartesian analysis. As for Book II, I will only discuss the first section, in which Descartes provides a new classification of curves and delimits the realm of geometry, which is central to the foundation of his geometry. Indeed, delimiting the subject matter of geometry is a central foundational problem which, just like the definition of the notion of number in Frege, has major consequences for the philosophy of mathematics and potentially for mathematical practice itself.

***Geometry*, Book I: The Algebra of Segments**

The opening of Book I tells us that “Any problem in geometry can easily be reduced to such terms that a knowledge of the lengths of certain straight lines is sufficient for its

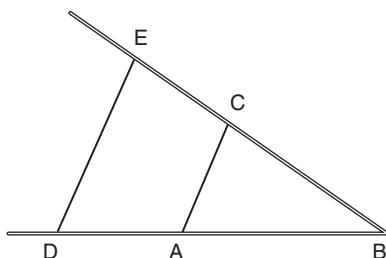


Figure 7.2

construction” (Descartes 1952: 297; AT 6:369). In particular, Descartes shows here how every problem that can be constructed by ruler and compass is to be solved by reducing all such problems to the construction of the root of a second degree equation. The construction of equations thus plays a central role in Descartes’s account. (On the construction of equations, see Bos 2001.) In order to show how this kind of construction works we need to explain how the arithmetical calculus is related to the operations of geometry. Descartes provides geometrical constructions for addition, subtraction, multiplication, division, and extraction of roots. He shows how all these operations can be interpreted as transforming line segments into other line segments. Let a and b be line segments. In order to exploit the resources of proportion theory, Descartes also introduces a line segment, denoted by 1, that functions as unity. Descartes gives the obvious interpretation of $a + b$ and $a - b$ (with a greater than b) as line segments. As for $a \cdot b$, a/b , and $\sqrt{a}$, they are those line segments that satisfy the following proportions:

$$1 : a = b : (a \cdot b)$$

$$a/b : 1 = a : b$$

$$1 : \sqrt{a} = \sqrt{a} : a$$

Consider the construction of $a \cdot b$ in figure 7.2.

Let $AB = 1$ be the unit segment. If we want to multiply the segment BD (denoted by a) by BC (denoted by b), we join A and C and draw DE parallel to AC . Then $BE = BD \cdot BC = a \cdot b$. This can be verified by using the similarity between the triangles ABC and DBE . Similar constructions can be given for a/b and $\sqrt{a}$. The importance of the exercise is to show that repeated application of these operations never leads outside the realm of segments. From ancient geometry to Viète, it had been customary to interpret the multiplication of two segments as giving rise to an area, and the multiplication of three segments as giving rise to a volume. But then one could not make geometrical sense of the multiplication of n lines for $n > 3$. Descartes’s construction elegantly bypasses this problem of dimensionality.

Now Descartes is ready to show us how all ordinary problems of geometry (those constructible by ruler and compass) can be solved. The strategy relies on three steps: naming, equating, and constructing:

Naming. Consider the problem already solved and give names to all the lines that seem required for its solution.

Equating. Ignore the difference between known and unknown lines and write down the relationships that hold between the different lines in the most natural way. This leads to an equation (or a set of equations) in which the same quantity is expressed in two different ways.

Constructing. Construct the equation, i.e., find its roots geometrically.

Descartes also shows that all problems that lead to a second degree equation can be constructed by ruler and compass. (I omit here the process of construction for the roots of a second degree equation.) He claims that this could not have been known to the ancients, for their treatises show that they proceeded at random and without method. Had they had a method, adds Descartes, they would have been able to solve Pappus' problem in full generality. We will see how Descartes uses the strategy of naming, equating, and constructing as we examine his solution to Pappus' problem.

Geometry, Book I: Pappus' Problem

Descartes's claim to have gone further than any of the ancients or his contemporaries rests in great part on his solution to Pappus' problem. The problem had been stated by Pappus in the *Collectiones*, but it was not tackled in full generality before Descartes. What follows concerns Descartes's version of Pappus' problem for four lines.

The problem: given four lines in position, AB, AD, EF, GH, and four angles, α , β , γ , δ , it is required to find a point C such that lines can be drawn from C to the lines AB, AD, EF, GH making angles α , β , γ , δ , respectively, such that the following relation is satisfied:

$$CB \cdot CF = CD \cdot CH$$

Moreover, it is required to find the locus of all such points C, i.e., "to know and to trace the curve containing all such points" (Descartes 1952: 307; AT 6:380).

Descartes selects AB and BC as principal lines, that is as the lines in terms of which all the other lines needed for the solution are to be expressed. According to the strategy already outlined above, he begins by naming. The segments AB and BC are denoted by x and y , respectively. Using the information given in the problem (that the lines are given in position), he names the other segments known to him (such as EA and AG). Moreover, since the angles α , β , γ , δ , are given, he expresses information about their sines and cosines by means of ratios between segments. For instance, the ratio AB/BR is given to us, say as z/b , where both z and b are constants. Since $AB = x$ we can then express BR as bx/z . Through a chain of similar ratios Descartes manages to express CB ($= y$), CD, CF, and CH in terms of the principal lines (x and y) and of the other information provided by the statement of the problem. Next comes equating: Descartes sets the equation $CB \cdot CF = CD \cdot CH$, which yields an equation of degree 2 in x and degree 2 in y . Finally comes the construction of the equation; here Descartes constructs the locus

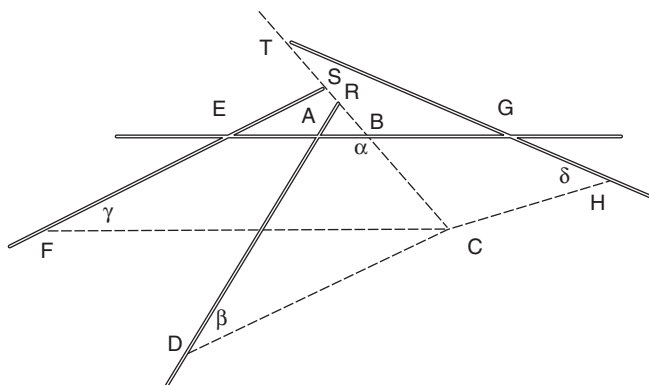


Figure 7.3

of points required by fixing an arbitrary value for y and then finding the root associated to the equation so parametrized. For each arbitrary value of y we can construct the (relevant) root of the second degree equation in x which results by using the construction of roots already provided by Descartes. The locus of all points C is that obtained by taking arbitrary values for y and constructing the corresponding values for x :

If then we should take successively an infinite number of different values for the line y , we should obtain an infinite number of values for the line x , and therefore an infinity of different points, such as C , by means of which the required curve could be drawn. (Descartes 1952: 313; AT 6:386)

This way of constructing a curve, point by point as it were, is known as pointwise construction, and it will be important in the discussion of the nature of curves which constitutes a central part of Book II.

In what follows I will turn to Book II and spell out Descartes's positive proposal for characterizing what is to be allowed in geometry. First, I will describe the types of construction that Descartes accepts as generating geometrical curves and those that yield mechanical curves. Then, I will try to articulate the cluster of concepts and strategies that Descartes appeals to when rejecting the mechanical curves from the realm of geometry.

Geometry, Book II: Descartes's Classification of Curves

In the opening part of Book II, Descartes approvingly recalls Pappus' distinction between plane, solid, and linear problems. Plane problems are those that can be constructed by means of straight lines and circles; solid problems those that can be constructed by using conics; and linear problems those that require more composite lines. This last category of problems is called linear, "for lines other than those mentioned are used in the construction, which have a varied and more intricate genesis, such as the spirals, the quadratrices, the conchoids and the cissoids, which have many marvellous

properties”(Pappus 1933: 38). But Descartes is “surprised . . . that they did not go further, and distinguish between different degrees of these more complex curves,” and he wonders “why they called the latter mechanical rather than geometrical” (Descartes 1952: 315; AT 6:388).

Descartes suggests that the ancients grouped together spirals, quadratrices, conchoids, and cissoids because in their inquiries they encountered the spiral and the quadratrix, curves that are merely mechanical, before the conchoid and the cissoid, curves that Descartes considered truly geometrical. In this passage Descartes talks about “the spiral, and the quadratrix, and similar curves, which really belong only to mechanics, and are not among those that I think should be included here, since they must be conceived of as described by two separate movements whose relation does not admit of exact determination” (Descartes 1952: 316–17; AT 6:390). Descartes’s proposal is that by “geometrical” should be understood what is precise and exact, and by “mechanical” what is not so. The curves to be admitted in geometry are given by a criterion that appeals to regulated motions.

Nevertheless, it seems very clear to me that if we make the usual assumption that geometry is precise and exact, while mechanics is not; and if we think of geometry as the science which furnishes a general knowledge of the measurements of all bodies, then we have no more right to exclude the more complex curves than the simpler ones, provided they can be conceived of as described by a continuous motion or by several successive motions, each motion being completely determined by those which precede; for in this way an exact knowledge of the magnitude of each is always obtainable. (Descartes 1952: 316; AT 6:389–90)

The geometrical curves obtained by use of the mesolabe, which we saw earlier, are paradigmatic examples of what Descartes has in mind. A unifying feature of devices such as the mesolabe is that the curves they generate have an algebraic equation (Descartes 1952: 319; AT 6:392). (Whether the algebraic equation is more than a tool in the economy of the *Geometry* is a hotly debated issue; see Mancosu 1996: 82.) Thus Descartes accepts constructions by points (as in the case of Pappus’ problem) and by regulated motions as legitimate geometrical solutions. Let me point out that I agree with Bos that Descartes maintains (in some cases implicitly) the extensional equivalence of the following three classes of curves: (1) curves generated by (uniform) pointwise construction; (2) curves generated by regulated continuous motions; (3) curves given by an algebraic equation.

But not all motions or all pointwise constructions are to be allowed in geometry.

Unacceptable motions

I have already quoted a passage where Descartes claims that the quadratrix and the spiral should be excluded from geometry because they are generated by two different motions “between which there is no relation that can be measured exactly.” Let us look more closely at the case of the quadratrix.

The quadratrix is a curve generated by the intersection of two segments, one moving with uniform rectilinear motion and the other with uniform circular motion. Let ABCD be a square, and BED the quadrant of the circle with center A (see figure 7.4).

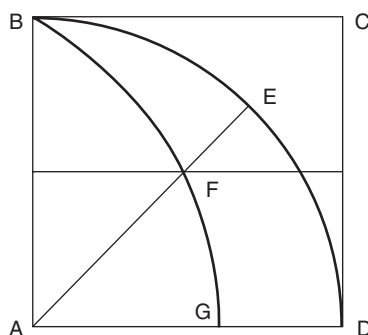


Figure 7.4

Let AB rotate uniformly clockwise towards AD, and let BC move with uniform rectilinear motion towards AD, keeping parallel to AD, in such a way that the two lines AB and BC start moving at the same time and end their motion by coinciding with AD at the same time. The locus of points described by the intersection of the two moving segments is the quadratrix. Sometimes employed to trisect an angle, the quadratrix was principally used in attempts to square the circle, although this was severely criticized even in ancient times. Pappus approves of Sporus' objection, according to which in order to adjust the speed of the motions as required for the construction of the curve one already needs to know what is sought, i.e., the quadrature of the circle. And Pappus concludes by consigning the construction to mechanics. We will investigate below in more detail Descartes's own reasons for excluding the quadratrix.

Unacceptable constructions by points

In the *Geometry*, Descartes does not give detailed examples of unacceptable constructions by points. However, he claims:

It is worthy of note that there is a great difference between this method in which the curve is traced by finding several points upon it, and that used for the spiral and similar curves. In the latter not any point of the required curve can be found at pleasure, but only such points as can be determined by a process simpler than that required for the composition of the curve. Therefore, strictly speaking, we do not find any of its points, that is, not any one of those which are so peculiarly points of this curve that they cannot be found except by means of it. On the other hand, there is no point on these curves which provide a solution for the proposed problem that cannot be determined by the method I have given. And since this way of tracing a curved line by determining several of its points at random applies only to those curves which can also be described by a regular and continuous motion we should not reject it entirely from geometry. (Descartes 1952: 339–40; AT 6:411–12)

A pointwise construction of the sort criticized by Descartes is found in Clavius. We have seen that Pappus agreed with Sporus that an appeal to the quadratrix in squaring the circle begs the question. But of course, this leaves open the possibility that a more

elementary construction of the same curve might be free from the objectionable features of the construction by two independent motions. In antiquity this led to the construction of the quadratrix starting from the spiral and the cylindrical helix that for Pappus have a firmer claim to geometrical status (see Molland 1976: 27). That is not Clavius's way out. In Book VI of the second (and third) edition of his *Commentaria in Euclidis Elementa* (Clavius 1591), Clavius presents a construction by points of the quadratrix. (For a description of the construction and for the textual argument for its connection to Descartes, see Gäbe 1972 and Mancosu 1996; for the quadratrix in Jesuit mathematics, see Garibaldi 1995.) In this text Clavius claims that his construction by points of the quadratrix, unlike that by independent motions, is geometrical. An obvious consequence of this is that the quadrature of the circle can be effected geometrically. However, a closer look at Clavius's construction shows that he has only constructed a subset of points on the curve. Moreover, the points he constructed are such that, to use Descartes's words, they can be "determined by a process simpler than that required for the composition of the curve." Thus, Descartes rejects the claim that Clavius has effected a geometrical construction of the quadratrix (indeed, not all its points can be constructed uniformly) and, as we will see below, he also rejects the claim that the quadrature of the circle can be effected geometrically.

Descartes, mechanical curves, and the quadrature of the circle

Clavius's attempt to construct the quadratrix geometrically highlights an important point I would like to raise. On what grounds can a curve be excluded from geometry? It is not enough to point to its generation by, say, two independent motions, because it may nonetheless be possible to generate the same curve in another "acceptable" geometrical way. (Thus, curves are not "intensional" objects, i.e., different descriptions might characterize the same curve: "moreover, one could find infinitely many different ways of describing these same ovals" (Descartes 1952: 356; AT 6:427).) Similarly, the fact that one might construct an equilateral triangle on a given segment by using means that go beyond the use of ruler and compass does not mean that the generation of an equilateral triangle on a segment cannot be done by ruler and compass alone. As Euclid I.1 shows, one can construct an equilateral triangle on any given segment by using only ruler and compass.

In the case of Descartes the problem becomes pressing, for in order to claim that certain curves, such as the spiral and the quadratrix, are mechanical he needs to show that no geometrical construction can possibly generate them. In short, excluding curves from the realm of the geometrical requires surveying all possible geometrical constructions and showing that the curve in question cannot be constructed by any combination of those geometrical means. But that was problematic: just as no one at that time could carry out such proofs for unconstructibility by ruler and compass, no one could give the kind of proof of impossibility that would be required in this case. Thus it appeared that the exclusion of curves such as the spiral and the quadratrix from the class of geometrical curves could only be a *tentative* exclusion motivated by the fact no acceptable constructions had hitherto been found. Unless . . . unless one could find a different criterion (or different criteria) that could allow one to recognize at least some of the non-geometrical curves by their effects, as it were. I will claim that Descartes's

strategy for the classification of several curves as mechanical, including the spiral and the quadratrix, relies on a local criterion of this kind. I call the criterion local as it does not exclude all the mechanical curves but only some (i.e., it does not provide necessary and sufficient conditions for the exclusion of the mechanical curves but only a sufficient condition). In order to explain my claim I need to say something more about the curves Descartes excludes and about the grounds he adduces for the exclusion; I will return to my claim later.

The individual mechanical curves known to Descartes at the time of the publication of the *Geometry* were very few. Indeed, in the *Geometry*, he explicitly mentions only the quadratrix and the spiral as examples of mechanical curves. We have seen that they are excluded from geometry because they are generated by two independent motions which do not bear an exact ratio to one another and because their pointwise constructions give only special points on the curve rather than all the points. There is another curve, mentioned in the correspondence in 1629, that Descartes claimed was mechanical, the cylindrical helix. This curve is important as it provides an example of yet another type of curve construction, i.e., construction by strings.

Construction by strings

In the *Geometry*, Descartes discusses constructions by strings:

Nor should we reject the method in which a string or loop of thread is used to determine the equality or difference of two or more straight lines drawn from each point of the required curve to certain other points, or making fixed angles with certain other lines. We have used this method in “La Dioptrique” in the discussion of the ellipse and the hyperbola. (Descartes 1952: 340; AT 6:412)

But he continues by claiming that not all constructions by strings should be counted as geometrical:

One cannot admit [in geometry] lines which are like strings, that is which are sometimes straight and sometimes curved, because the proportion between straight lines and curved lines is not known, and I also believe it cannot be known by men, so one cannot conclude anything exact and certain from it. (Descartes 1952: 340; AT 6:412)

Descartes does not give examples in the *Geometry* of such non-geometrical constructions, but a look at the correspondence reveals at least two. The first concerns the construction of the cylindrical helix obtained by using a thread. The second consists in the rectification of the circumference postulated at the outset of the Archimedean quadrature of the circle. Let me begin with the latter. In a letter to Mersenne dated May 27, 1638 Descartes says:

You ask me if I think that a sphere which rotates on a plane describes a line equal to its circumference, to which I simply reply yes, according to one of the maxims I have written down, that is that whatever we conceive clearly and distinctly is true. For I conceive quite well that the same line can be sometimes straight and sometimes curved, like a string. (AT 2:140–1)

In my opinion, this passage constitutes quite a challenge to all those who would like to use clearness and distinctness as the criteria which together define what can be conceived geometrically in opposition to what can only be analyzed mechanically. (On this, see the discussion in Jullien 1999.) What the passage indicates is that Descartes has no problem in conceiving clearly and distinctly of a circumference equal in length to a straight line, as in Archimedes' quadrature of the circle, where we begin by straightening the circumference; nevertheless, since the proportion between the circular and the straight lines is unknown to us (and cannot be known, adds Descartes), this procedure is not geometrical. To analyze his views more fully, let us distinguish three theses:

- A. There is no (exact) proportion between straight and curved lines.
- B. The proportion between straight and curved lines cannot be known (exactly).
- C. The proportion between straight and curved lines is not known (exactly).

If we replace "straight line" by "radius of a circle" and "curved line" with "circumference of a circle," we get these three claims relativized to a particular case:

- Ar. There is no (exact) proportion between the radius and the circumference of a circle.
- Br. The proportion between the radius and the circumference of a circle cannot be known (exactly).
- Cr. The proportion between the radius and the circumference of a circle is not known (exactly).

The three relativized claims obviously follow from the respective unrelativized claims. Although A and B (and thus Ar and Br) are certainly different theses, I have no grounds for claiming that Descartes really distinguished them. In any case, he refers only to B and C. In the opinion of Bos, thesis B is the very foundation of Descartes's distinction between geometrical and mechanical curves:

Thus the separation between the geometrical and non-geometrical curves which was fundamental in Descartes' vision of geometry, rested ultimately on his conviction that proportions between curved and straight lines cannot be found exactly. This, in fact, was an old doctrine, going back to Aristotle. The central role of the incomparability of straight and curved in Descartes' geometry explains why the first rectifications of algebraic (i.e. for Descartes geometrical) curves in the late 1650s were so revolutionary; they undermined a cornerstone of the edifice of Descartes' geometry. (Bos 1981: 314–15; see also, almost verbatim, Bos 2001: 342)

I agree with Bos that Descartes believed B and C in their pure (and therefore also in their relativized) form, but I disagree with him about how A, B, and C effectively function in the economy of the *Geometry*. I claim that the algebraic rectification of certain algebraic curves in the 1650s did not undermine the foundations of Descartes's *Geometry*; indeed, no one to my knowledge claimed this to be the case at the time. A more careful look at Descartes's practice of exclusion of the spiral, the quadratrix, and the like reveals that the foundation of this theoretical position is to be found in his

explicit belief that the quadrature of the circle is impossible geometrically. It is this belief, I claim, that allows Descartes to be definite about his claim that these curves will never receive a geometrical construction. While the algebraic rectification of certain algebraic curves destroys A, B, and C, it leaves untouched Ar, Br, and Cr, since the circle, although having an algebraic equation, cannot be algebraically rectified.

Now we can return to my claim that an unacceptable construction of a curve cannot by itself show that the curve is not geometrical because an alternative construction might reveal that the curve is geometrical after all. However, if the existence of a curve with certain properties, whatever its construction, allows us to resolve a problem which (for whatever reason) we take to be impossible to solve geometrically, then we can conclude that the curve cannot be geometrical. Thus, I claim that the quadrature of the circle works exactly as described: Descartes holds that the quadrature of the circle cannot be effected geometrically and that every curve which allows us to square the circle must be mechanical (i.e., non-geometrical). I will adduce several arguments for the claim.

Let us consider first of all the letter to Mersenne dated November 13, 1629. The background is this. Mersenne had apparently announced a construction due to a certain Gaudéy for the division of the circle into 27, 29, and perhaps other numbers of parts. Descartes replies that the division into 29 cannot be achieved geometrically whereas the division into 27 can. Moreover, he added that if Mersenne sent him the construction he would show him why it is not geometrical. Indeed, having seen the construction he replies:

Mr. Gaudéy's invention is very good and very exact in practice. However, so that you will not think that I was mistaken when I claimed that it could not be geometric, I will tell you that it is not the cylinder which is the cause of the effect, as you had me understand and which plays the same role as the circle and the straight line. The effect depends on the helix which you had not mentioned to me, which is a line that is not accepted in geometry any more than that which is called quadratrix, since the former can be used to square the circle and to divide the angle in all sorts of equal parts as precisely as the latter can, and has many other uses as you will be able to see in Clavius' commentary to Euclid's Elements. For although one could find an infinity of points through which the helix or the quadratrix must pass, one cannot find geometrically any one of those points which are necessary for the desired effect of the former as well as of the latter. Moreover, they cannot be traced completely except by the intersection of two movements which do not depend on each other; or better the helix by means of a thread [*filet*] for revolving a thread obliquely about the cylinder it describes exactly this line; but one can square the circle with the same thread so precisely that this will not give us anything new in geometry. This does not stop me from admiring Mr. Gaudéy's invention and I do not think that one could find a better one for the same effect. (AT 1:70–1)

This long and dense passage brings together many of the claims I have already anticipated. First, it shows that Descartes had detailed knowledge of the section on the quadratrix in Clavius. Secondly, it shows that in addition to the spiral and the quadratrix he had also considered the cylindrical helix and had excluded it from the class of geometrical curves. Look carefully at the argument in the text. Both curves are such that only special points can be constructed on them. Moreover, the quadratrix is excluded because it is generated by two independent motions and the helix because it

is generated by a thread [*filet*]. But ultimately they are both excluded because they can be used to square the circle. We see here at work the local criterion for exclusion of some of the mechanical curves based on the quadrature of the circle.

I want to add two more arguments in favor of the claim that the quadrature of the circle acts as a sufficient criterion for the exclusion of some of the mechanical curves. The first consists in the observation that the three curves explicitly mentioned by Descartes in his correspondence and his geometrical work until and including the *Geometry* are the quadratrix, the spiral, and the cylindrical helix.¹ We know from Iamblichus that the curves which had been used in antiquity to square the circle were exactly the quadratrix, the spiral, and the cylindrical helix (Heath 1921, 1: 225). Moreover, in Pappus' *Collectiones* we find that a description of the quadratrix (Book IV, XXX) is immediately followed by a construction of the cylindrical helix (Book IV, XXXIII). Pappus motivates this construction by claiming that the description of the quadratrix is "too mechanical." This section aims at showing that the quadratrix can be constructed geometrically by means of the cylindrical helix. But, for Descartes, the force of the argument goes exactly in the opposite direction: because the cylindrical helix gives rise to a construction of the quadratrix and the quadratrix allows us to square the circle, the cylindrical helix cannot be geometrical.

Finally, all of my interpretation would collapse if it turned out that Descartes even envisaged that the circle might be squared geometrically. But this was not the case. Descartes believed that the quadrature of the circle was impossible. In a letter to Mersenne dated March 31, 1638 he says:

For, in the first place, it is against the geometers' style to put forward problems that they cannot solve themselves. Moreover, some problems are impossible, like the quadrature of the circle, etc. (AT 2:91)

Coming back then to the logical question of what rests on what. The quadrature of the circle is equivalent (by Archimedes' proof) to the rectification of the circumference. Thus what Descartes appeals to when he excludes the quadratrix, the spiral, and the cylindrical helix is the lack of an exact proportion between the radius and the circumference of a circle (i.e., the aforementioned thesis Br): the circumference cannot be algebraically rectified. This was a correct guess, as we know from Lindemann's 1882 proof of the transcendence of π , but an unproven one in Descartes's time. However, this is why the algebraic rectification of algebraic curves given in the 1650s leaves unthreatened the Cartesian distinction between geometrical and mechanical curves. Only a geometrical (i.e., algebraic) rectification of the circumference would have destroyed Descartes's foundational position in the *Geometry*.

Conclusion

I have endeavored to convey to the reader a sense of the complexity of the interaction between philosophy and mathematics in Descartes's thought. In the first parts of this chapter we saw the paradigmatic role that mathematics played in the elaboration of the method, and then we saw how certain "foundational" tenets played a role in

shaping the structure of the *Geometry* and its epistemological and ontological boundaries. However, such foundational views are not always spelled out by Descartes with the clarity one would wish for, and they have to be analyzed in the context of his mathematical practice and his comments on this practice. In short, for Descartes, mathematical practice and philosophical thought are deeply intertwined, and an understanding of his thought that ignored either one of the two aspects would not be able to account for the beauty and complexity of Descartes's epoch-making contributions to mathematics and philosophy.

Acknowledgments

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Note

- 1 A possible fly in the ointment is the *linea proportionum* discussed by Descartes in the *Cogitationes Privatae* (AT 10:222–3). However, I am only claiming that the criterion under discussion is only a sufficient not a necessary condition for a curve to be mechanical. That is because in general there will be curves, like the *linea proportionum*, which are mechanical but are irrelevant (in a sense that can be made technical) to the problem of squaring the circle.

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Chapter 8

Descartes's Optics: Light, the Eye, and Visual Perception

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Descartes's theories of light and vision were central components of his natural philosophy, closely linked to his cosmology, physics, theory of matter, and theory of perception. He was a systematic thinker, seeking to create a new philosophy of nature, founded on a new metaphysics. As an advocate of the new mechanical philosophy he faced several challenges. He needed to replace traditional – usually Aristotelian – explanations of natural phenomena with explanations couched in terms of matter and motion, the ultimate terms of explanation of the mechanical philosophy. By eliminating Aristotelian forms and real qualities from his philosophy of nature, Descartes needed to formulate new explanations of the qualities of bodies and our perception of them. His work on optics focused on these questions.

Background

Despite Descartes's innovations – especially his account of the law of refraction and his mechanical explanations of optical phenomena – his treatment of light and vision was rooted in ancient and medieval discussions. The ancient Greek mathematicians Euclid (fl. ca. 300 BC), Hero of Alexandria (fl. AD 62), and Claudius Ptolemy (fl. AD 127–48) approached the problem of vision geometrically. They assumed that light travels in straight lines and that they could analyze vision by tracing the passage of light from the object seen to the eye. This practice of applying geometry to the problem of vision was called mixed mathematics, falling into neither the discipline of physics nor the discipline of mathematics, as defined in Aristotle's classification of the sciences (Osler 2002). In medieval discussions, which were organized according to an Aristotelian classification of the sciences, geometrical optics, or ray-tracing, was considered to be mixed mathematics (mathematics as applied to the physical world) rather than a part of physics or natural philosophy, which dealt with the causes of phenomena. The explanation of optical phenomena was an aspect of natural philosophy, generally associated with theories of vision. The medieval writer who had the greatest influence on early modern thinking about light and vision was 'Abu 'Alī al-Hasan ibn al-Hasan ibn al-Haytham, who was known in the Latin West as Alhazen (965–ca. 1039). Alhazen adopted an intromission theory, namely the theory that vision occurs when light enters

the eye. He combined the Greek practice of ray-tracing with his theory of vision by introducing a point-by-point analysis of object and image. Instead of considering the object and image as wholes, he considered each point on the object and traced the path of light from that point to the eye, thereby showing how the image is constructed point by point within the eye. Alhazen's ideas were promoted by two thirteenth-century writers, the Franciscan John Pecham (ca. 1230–92) and the Polish Neoplatonist Witelo (fl. 1250–75). Both men wrote treatises entitled *Perspectiva*, in which they developed Alhazen's theory of vision (Lindberg 1976). These ideas are particularly important in understanding Descartes's theories of light and vision because of their impact on Johannes Kepler (1571–1630). Kepler's books, *Ad Vitellionem paralipomena* (*A Supplement to Witelo*) (1604) and *Dioptrice* (1611) lay the foundations for developments in optics during the seventeenth century. The former book featured and developed Alhazen's point-by-point analysis, and the latter addressed the problem of finding a mathematical law of refraction in an attempt to explain Galileo's telescope. Descartes was well acquainted with these books, and they provided the starting point for his own work on light and vision (Ribe 1997: 45).

The World and Treatise on Man (1633)

From the outset, light played an important role in Descartes's thinking. *The World, or Treatise on Light* and *Treatise on Man* – composed between 1629 and 1633 but not published during his lifetime – adumbrated themes that he continued to develop in later writings. The title of *The World* provides sufficient evidence that the understanding of light was central to Descartes's project in cosmology and natural philosophy.

Before he started to write the books, he explained, he had hoped “to include in it all that I thought I knew concerning the nature of material things. . . . Fearing that I could not put in my discourse all that I had in my thoughts, I undertook to do no more than expose quite amply what I then conceived the nature of light to be” (Descartes 2001: 34–5; AT 6:41–2). But, he continued, it soon became clear that to explain every aspect of light was almost as broad a task as explaining the nature of material things in general.

Then I took the occasion to add something about the sun and the fixed stars, because almost all light proceeds from them; and about the heavens, because they transmit light; and about the planets, comets, and earth, because they reflect it; and in particular about all the bodies on the earth, because they are either colored or transparent or luminous; and finally about man, since he is the observer of light. (Descartes 2001: 35; AT 6:42)

Descartes's aim in *The World* was to establish that the cause of light is motion. Accomplishing this goal required formulating an explanation of qualities, a theory of matter, laws of motion, an explanation of the heavens, and a theory of perception.

The opening chapter of *The World*, entitled “On the Difference between Our Sensations and the Things that Produce Them,” makes a direct connection between Descartes's theory of light and the mechanical philosophy, of which he was one of the founders. Descartes began *The World* by stating,

In proposing to treat here of light, the first thing I want to make clear to you is that there can be a difference between our sensation of light (i.e., the idea that is formed in our imagination through the intermediary of our eyes) and what is in the objects that produce that sensation in us (i.e., what is in the flame or in the sun that is called by the name of "light"). (Descartes 1979: 1; AT 11:1)

The close relationship among the phenomena of light, their explanation, and the analysis of vision is unambiguously evident in this statement. The relationship between Descartes's theory of light and the mechanical philosophy is equally evident. The theory of primary and secondary qualities was a key element of the mechanical philosophy, according to which all natural phenomena should be explained in terms of matter and motion and secondary qualities result from the interaction between the primary qualities and our senses. Descartes developed all these themes in *The World*.

Establishing that the perception of light is caused by motion was one of the central themes of *The World*. To this end, he discussed the nature of matter and our perception of its qualities, the elements and their qualities, the laws of nature, and the sun, stars, and comets. On the basis of this philosophy of nature, he then explained how light and its properties are caused by matter and motion. In order to make plausible the claim that light is caused by matter in motion, Descartes began by showing that flame and heat result from matter and motion.

I know of only two sorts of bodies in the world in which light is found; to wit, the stars and flame or fire. And because the stars are without a doubt farther from human knowledge than is fire or flame, I shall try first to explicate what I observe regarding flame. (Descartes 1979: 7; AT 11:7)

Observing the action of flame on wood, Descartes noted that it moves the small parts of the wood.

Now, insofar as it does not seem possible to conceive that one body could move another unless it itself were moving, I conclude from this that the body of the flame that acts against the wood is composed of small parts, which move independently of one another with a very fast and very violent motion. (Descartes 1979: 9; AT 11:8)

This motion acts on the wood to break it down into soot and ash and also generates in us a sensation of heat, which Descartes claimed is a kind of pain.

In order to demonstrate that light, like heat, results from motions of very small bodies, Descartes analyzed the nature of matter and the nature of motion, in essence developing the general principles of his natural philosophy. In order to establish the nature of the matter of light, Descartes presented his theory of the elements. He thought that there were three elements all consisting of the same matter, but distinguished by the size of their constituent particles. The first element is the element of fire, which consists of the smallest particles, which move extremely swiftly and can take on any shape whatsoever. Because Descartes denied the existence of void, he thought that these smallest particles fill all the spaces and interstices between the larger particles of which the other elements consist. The second element, which he claimed to be the element of air, is also a very subtle fluid, consisting of spherical particles, "joined

together like grains of sand or dust" (Descartes 1979: 39; AT 11:25). Although small compared to the particles of the third element, they are large compared to the first. The third element, the element of earth, consists of much larger particles, which "have little or no motion that might cause them to change their position with respect to one another" (*ibid.*). All of the qualities ascribed to bodies can be explained in terms of the motion, size, shape, and arrangement of their parts. Luminous bodies, like the sun and the stars, consist of the first element, while the Earth, comets, and planets, which do not emit their own light, consist largely of the third element. The second element is the medium through which light is propagated (Gaukroger 2002: 18).

In order to explain particular phenomena in terms of the motions of matter, Descartes appealed to "the laws of nature . . . that God imposed on her" (Descartes 1979: 59; AT 11:36). Identifying nature with matter, Descartes stated that "God continues to preserve it in the same way that He created it" (Descartes 1979: 59; AT 11:37). Therefore all the changes that matter undergoes must be attributed to God. "The rules according to which these changes take place I [Descartes] call the 'laws of nature'" (*ibid.*).

Descartes's laws of nature codify the new science of motion first presented by Galileo Galilei (1564–1642).

The first is that each individual part of matter always continues to remain in the same state unless collision with others forces it to change that state. (Descartes 1979: 61; AT 11:38)

I suppose as a second rule that, when one of these bodies pushes another, it cannot give the other any other motion except by losing as much of its own at the same time: nor can it take away from the other body's motion unless its own is increased as much. (Descartes 1979: 65; AT 11:41)

I will add as a third rule that, when a body is moving, even if its motion most often takes place along a curved line and . . . can never take place along any line that is not in some way circular, nevertheless each of its individual parts tends always to continue its motion along a straight line. And thus their action, i.e., the inclination they have to move, is different from their motion. (Descartes 1979: 71; AT 11:43–4)

Just as he would do later in the *Principles of Philosophy*, Descartes justified these laws of nature by appealing to the immutability of God. The laws provide the groundwork for an analysis of orbital motion and impact, the fundamental physical processes in the mechanical world Descartes envisioned.

It may seem strange that Descartes placed the foundations for a new science of motion in the middle of a treatise on light; but, in fact, the new physics provided the necessary explanatory framework for his analyses of light and vision as the products of matter in motion. Using the laws of motion to compare the motions and tendencies of particles of the second element to those of a stone on a sling, Descartes explained how motion is transmitted in rectilinear rays from luminescent heavenly bodies. When these motions strike the surface of a human eye, they cause a sensation of light (Descartes 1979: 171; AT 11:97). This light has a number of characteristic properties, which must be accounted for by any explanation. These properties include the fact that it extends from luminous bodies instantaneously in straight lines to any distance; that rays of light can cross paths without interfering with each other; and that they can

be diverted by reflection. Considering the rays of light to be composed of streams of particles of the second element, Descartes would provide mechanical explanations of all these phenomena. In this way, Descartes would accomplish a major task facing the new mechanical philosophy: he would reinforce the fundamental assumption of the mechanical philosophy that all the qualities of things can be explained in terms of matter and motion by demonstrating how the phenomena of light and vision can be explained in these terms.

In *The World*, Descartes dealt with the inanimate world. In the *Treatise on Man*, he turned to the explanation of living things, particularly human physiology.

These men [those living in the imaginary world described in *The World*] will be composed, as we are, of a soul and a body, and I must first separately describe for you the body; then, also separately, the soul; and finally I must show you how these two natures would have to be joined and united to constitute men resembling us. (Descartes 1972: 1; AT 11:119–20)

Here he anticipated the metaphysics he would develop in the *Meditations*. But for now, he addressed the human body and how it could be explained in mechanical terms.

I assume their body to be but a statue, an earthen machine formed intentionally by God to be as much as possible like us. Thus not only does He give it externally the shapes and colors of all the parts of our bodies; He also places inside it all the pieces required to make it walk, eat, breathe, and imitate whichever of our own functions can be imagined to proceed from mere matter and to depend entirely on the arrangement of our organs. (Descartes 1972: 2–4; AT 11:120)

Among the physiological functions that Descartes explained in the *Treatise on Man*, vision is paradigmatic of his account of sensation and perception.

This sense depends, in this machine [as in us] on two nerves which must doubtless be composed of many filaments. These filaments must be as delicate and as easily movable as possible, inasmuch as they are destined to report to the brain the divers actions of the particles of the second element – which actions, in accordance with what has been said earlier, will enable the soul, when united with this machine, to conceive the diverse ideas of colors and light. (Descartes 1972: 49; AT 11:151)

Descartes followed this statement about vision with a detailed description of the structure of the eye, showing how its anatomy produces the resulting perceptions. His account of vision supported the initial claim of *The World*, namely that what we perceive is unlike the objects that cause our perceptions. This claim distinguishes his view from that of the Scholastics, who argued that the form of the perceived object is somehow conveyed to the eye by the so-called visual species that replicate the form in the human intellect so that we have direct acquaintance with the form. Likewise, this claim distinguishes Descartes's view from that of the Epicureans, who believed that vision is produced by the passage of an outer peel of the object into the human eye. Departing from both traditional versions of direct realism, Descartes's theory of vision – as seen as an exemplar of the mechanical philosophy – introduced a subjective element into visual

perception: the motions of light stimulate motions in the eye, which the soul or intellect interprets as an image.

In discussing the production of sensations that come to us from more than one sense, Descartes addressed one further issue central to his theory of knowledge: why our senses, particularly vision, sometimes give us deceptive perceptions. These deceptions – say about the distance of an object – can arise from the situation of the object, the situation or distortion of our organs of sense, or from mistakes in judging the actual size of an object from the points that assemble at the back of the eye. This explanation of how the senses can deceive us reinforces a point Descartes developed in the *Meditations*, namely that the intellect is indispensable to knowledge (2:57; AT 7:82–3). Moreover, in providing this mechanical explanation of deceptive perceptions, Descartes may have been attempting to articulate a response to the traditional skeptical arguments about the senses that he used so powerfully in the *Discourse on Method* and the *Meditations*.

Optics (1637)

Published in 1637 as one of the *Essays* printed with the *Discourse on the Method*, the *Optics* is Descartes's most thorough account of light and vision. He wrote it during the same period that he wrote *The World*, in which he frequently referred to it. The *Optics* contains the same assumptions and basically takes the same approach as *The World* and the *Treatise on Man*.

The *Optics* contains Descartes's most significant contributions to optics: a mechanical explanation of the phenomena of light; proofs of the laws of reflection and refraction on the basis of mechanical assumptions; and an account of the physics and physiology of vision. His stated motive for this book is to explain the workings of the telescope, something that no one had yet accomplished. The book opens with a statement of the problem and concludes with two chapters explaining how the telescope works and describing a method of grinding lenses of the appropriate curvatures. Within this frame, he developed an elaborate theory of light and vision.

Seeking to explain the observed properties of light, Descartes elaborated three different mechanical models – he called them *comparaisons* – which enabled him to explain the phenomena of colors, the transmission of light through solid, transparent matter, and the laws of reflection and refraction. In the first model, he compared light to a blind man's stick, which enables him to perceive the various objects in his environment by touch alone.

Consider light as nothing else, in bodies that we call luminous, than a certain movement or action, very rapid and very lively, which passes toward our eyes through the medium of the air and other transparent bodies, in the same manner that the movement or resistance of the bodies that this blind man encounters is transmitted to his hand through the medium of his stick. This will prevent you from finding it strange at first that this light can extend its rays in an instant from the sun to us; for you know that the action with which we move one of the ends of a stick must thus be transmitted in an instant to the other end, and that it would have to go from the earth to the heavens in the same manner. (Descartes 2001: 67; AT 6:83–4)

This model also makes it plausible to claim that the perception of colors results from matter in motion.

[Y]ou have only to consider that the differences which a blind man notes among trees, rocks, water, and similar things through the medium of his stick do not seem less to him than those among red, yellow, green, and all the other colors seem to us; and that nevertheless these differences are nothing other, in all these bodies, than the diverse ways of moving, or of resisting the movements of, this stick. (Descartes 2001: 67–8; AT 6:84)

The success of this mechanical analogy reinforced Descartes's view that nothing material passes from the object to our eyes to make us see color or form and that there is nothing in the object similar to the sensations we have of it. As an aside, he addressed the controversy about whether vision involves only the intromission of light into the eye or also the emission of something from the eye that makes objects visible:

Because this action [the extromission of visual rays from the eye to the object] is nothing other than light, we must note that it is only those who can see during the darkness of night, such as cats, in whose eyes this action is found. (Descartes 2001: 68; AT 6:86)

In the second model he compared the rectilinear transmission of light and the passage of light through solid, transparent matter to wine flowing through a vat full of grapes and passing out of a hole in the bottom of the vat:

Now consider that, since there is no vacuum in Nature, as almost all the Philosophers affirm, and since there are nevertheless many pores in all the bodies that we perceive around us, as experiment can show quite clearly, it is necessary that these pores be filled with some very subtle and very fluid material, extending without interruption from the stars and planets to us. Thus, this subtle material being compared with the wine in that vat, and the less fluid or heavier parts, of the air as well as of other transparent bodies, being compared with the bunches of grapes which are mixed in, you will easily understand the following: Just as the parts of this wine . . . tend to go down in a straight line through the hole [and other holes in the bottom of the vat] . . . at the very instant that it is open . . . without any of those actions being impeded by the others, nor by the resistance of the bunches of grapes in this vat . . . in the same way, all of the parts of the subtle material, which are touched by the side of the sun that faces us, tend in a straight line towards our eyes at the very instant that we open them, without these parts impeding each other, and even without their being impeded by the heavier particles of transparent bodies which are between the two. (Descartes 2001: 69; AT 6:86–7)

In this model, he appealed directly to his theory of the elements.

In the third model Descartes used the behavior of the tennis ball to derive the known laws of reflection and refraction, thus demonstrating how these fundamental optical phenomena could be incorporated into a mathematized mechanical philosophy. He based his demonstration on the three laws of motion, first articulated in *The World* and later revised and refined in the *Principles of Philosophy*.

The law of reflection – that the angle of incidence equals the angle of reflection (the angles measured from a line perpendicular to the reflecting surface) – had been known

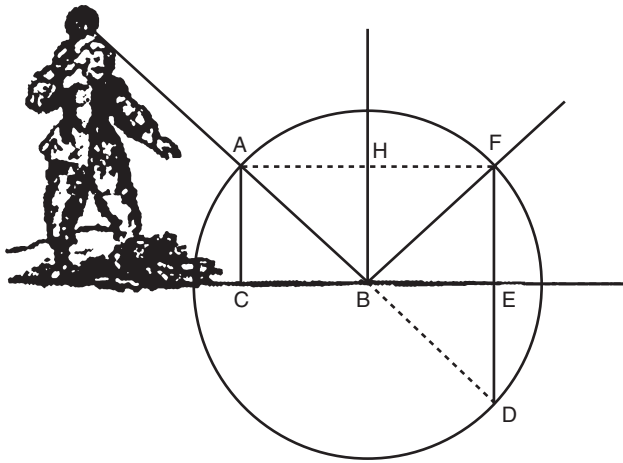


Figure 8.1

since ancient Greek times. Ptolemy was the first to publish the result, but it had probably been known long before. Descartes's contribution was to show how the law followed from his laws of motion when he used the model of the tennis balls for the particles of the second element that compose rays of light. Consider a ball moving from A to B at a constant speed (see figure 8.1). What happens when it strikes the surface CBE, which Descartes assumed to be perfectly flat and hard?

Given the assumptions of a Galilean account of motion, it is possible to analyze the motion AB into two components, AH and AC, moving at right angles to each other. When the ball arrives at B, the component AH, moving in a straight line at a uniform speed, will be unchanged; therefore, it will travel from H to F in the same amount of time that it traveled from A to H. This conclusion follows from the first law of motion that Descartes stated in *The World*: "that each individual part of matter always continues to remain in the same state unless collision with others forces it to change that state" (Descartes 1979: 61; AT 11:38). The other component, AC, is an example of impact, a phenomenon ruled by the second law of motion: "that, when one of these bodies pushes another, it cannot give the other any other motion except by losing as much of its own at the same time: nor can it take away from the other body's motion unless its own is increased as much" (Descartes 1979: 65; AT 11:41). Because in this case the ball is much smaller than the ground it strikes, it bounces off the ground, returning to its original place at the same speed but in the opposite direction. The two new components, HF and EF, combined will place the ball at F. Now a simple geometrical argument proves that the two triangles ABH and FBH are congruent. Consequently the angles ABH (the angle of incidence) and HBF (the angle of reflection) are equal.

And so you can easily see how reflection occurs, namely, according to an angle which is always equal to the one we call the angle of incidence, in the same way that if a ray coming from point A, falls to point B on the surface of a flat mirror CBE, it is reflected toward F in such a manner that the angle of reflection FBE is neither greater nor smaller than that of the angle of incidence ABC. (Descartes 2001: 77; AT 6:96)

With the insouciance with which mathematicians say that a difficult conclusion follows *obviously* from an abbreviated line of reasoning, Descartes reduced the phenomenon of reflection to a problem of mechanical impact.

He approached the explanation of the law of refraction similarly. The law, in modern notation, states $\sin i = n \sin r$, where i is the angle of incidence and r is the angle of refraction, and n is called the index of refraction. Unlike the law of reflection, the law of refraction had eluded investigators since antiquity. Although lenses had been used to magnify small objects, to light fires, and to correct vision for many centuries, no one before the seventeenth century had managed to establish a law of refraction. Kepler tried to derive the law from an analysis of Witelo's tables of angles, but failed to come up with an adequate result. Thomas Harriot (ca. 1560–1621) discovered the law empirically, but his results remained unpublished until the twentieth century. Stimulated by Galileo's use of the telescope, Kepler tried to analyze lenses mathematically, but still failed to find a law. Around 1620, Willebrord Snel (1580–1626) discovered the law empirically. Descartes's knowledge of the law may have been based on Snel's work or may have been the result of his own research. His role in the discovery is still a matter of controversy (Dijksterhuis 2000).

Descartes's proof of the law of refraction followed the same strategy as his proof of the law of reflection. Comparing a particle from a ray of light to a tennis ball, he asked what would happen if the tennis ball struck and penetrated a soft surface like a cloth. Once again, he approached the problem by breaking down the particle's path into its component motions.

Now given this, to know what path it must follow let us consider once more that its movement differs entirely from its determination to move in one direction rather than another, from which it follows that the quantity of these [two factors] must be examined separately. And let us also consider that, of the two parts of which we can imagine this determination to be composed, only the one that was causing the ball to tend from high to low can be changed in any manner through the encounter with the cloth; and that the one that was causing it to tend toward the right hand must always remain the same as it was, because in no way does this cloth oppose its going in this direction. (Descartes 2001: 77–8; AT 6:96–7)

Descartes used the tennis ball striking and penetrating a cloth as a model of a ray of light passing from air to water (see figure 8.2).

Suppose that the ball traveling from A to D strikes water at the point B. Suppose also, that when the ball strikes the water it loses half its speed. "This ball must pass from B in a straight line, not toward D, but toward I." The reason for this change of direction is that the water slows the downward component of the motion, so that EI is equal to half of HB. But it does not affect the speed of the component BE, which is equal to the component AH. (Descartes 2001: 78–9; AT 6:98–9)

Finally, inasmuch as the action of light follows in this respect the same laws as the movement of the ball, it is necessary to say that when its rays pass obliquely from one transparent body to another which receives them more or less easily than the first, they are deflected in such a manner that they are always less inclined to the surface of these bodies on the side of the one that receives them most easily than on the side of the other, and that

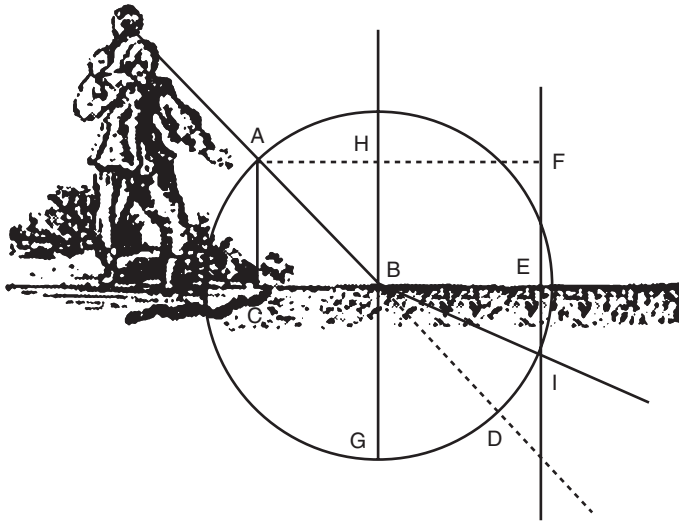


Figure 8.2

this [is] exactly in proportion to the ease with which the one rather than the other receives them. (Descartes 2001: 80; AT 6:100–1)

The exact quantity of deflection of light as it passes from one medium to another must be determined experimentally. For each medium, these measurements will provide the constant of proportionality, or index of refraction, to use the modern phrase. If that constant is expressed as n , then the light is refracted according to the formula $HB/AB = n EI/BI$, that is, $\sin i = n \sin r$, where $i = ABH$ and $r = EBI$ (Descartes 2001: 81–2; AT 6:100–1). As in the case of reflection, Descartes drew a direct analogy between a mechanical model and the phenomenon of refraction in order to show that the optical phenomenon could be derived from the first principles of his natural philosophy.

What epistemological status did Descartes ascribe to these mechanical models?

Not having here any other occasion to speak of light than to explain how its rays enter into the eye, and how they can be deflected by the different bodies that they encounter, I need not undertake to explain its true nature. And I believe that it will suffice that I make use of two or three comparisons which help to conceive it in the manner which to me seems the most convenient to explain all those of its properties that experience acquaints us with, and to deduce afterwards all the others which cannot be so easily observed; imitating in this the Astronomers, who, although their assumptions are almost all false or uncertain, nevertheless because these assumptions refer to different observations which they have made, never cease to draw many very true and well-assured conclusions from them. (Descartes 2001: 66–7; AT 6:83)

The models Descartes constructed were no more arbitrary than those of the astronomers. Like the pre-Copernican astronomers who assumed that their models must be

constructed from various combinations of uniform circular motion without claiming physical reality for their mathematical models, Descartes assumed that his models must be couched in terms of the fundamental laws of nature and his ultimate terms of explanation, matter and motion. But Descartes believed that he could do better than the astronomers had. He thought he could move beyond hypothetical models and actually establish the truth of his mechanical models by a complex process of experiment and observation (Garber 1978). Such mechanical analogies, once proven to account adequately for the observed phenomena, could then be deduced from first principles, or so Descartes thought.

These reasonings of ours will perhaps be included among the number of these absolutely certain things by those who consider how they have been deduced in a continuous series from the first and simplest principles of human knowledge. Especially if they sufficiently understand that we can feel no external objects unless some local movement is excited by them in our nerves; and that such movement cannot be excited by the fixed stars, very far distant from here, unless some movement also occurs in these and in the whole intermediate heaven: for once these things have been accepted, it will scarcely seem possible for all the rest, at least the more general things, which I have written about the World and the Earth to be understood otherwise than as I have explained them. (Descartes 1983: 227–8; AT 8A:328–9)

Having shown – to his own satisfaction – that the properties of light can be incorporated into his mechanical philosophy of nature, Descartes turned to the question of vision, which he approached as a special case of the senses in general. In the *Optics*, he gave a physiological account of sensation, beginning with a description of the nerves:

In order to understand in greater detail how the mind, located in the brain, can thus receive impressions of external objects through the mediation of the nerves, it is necessary to distinguish three things in these nerves: these are, first, the membranes which enclose them, and which, originating in those that enclose the brain, are like little tubes divided in many branches, which go spreading here and there throughout the members, in the same way as do the veins and arteries; second, their interior substance, which extends in the form of little threads throughout the length of these tubes, from the brain whence it originates, all the way to the extremities of the other members where it is attached, such that we can imagine in each of these small tubes, many of these separate fibers independent of each other; and finally the animal spirits, which are like a very subtle wind or air which, coming from the chambers or concavities in the brain, flows away by these same tubes throughout the muscle. . . . It is the spirits flowing through the nerves into the muscles, and expanding them more or less – sometimes these, sometimes those, according to the various ways that the brain distributes them – which cause the movement of all the members. . . . It is the small threads composing the interior substance of the nerves which are used for sensation. (Descartes 2001: 87–8; AT 6:109–10)

Sensations occur when motions are transmitted from our sense organs through the fibers to the brain. These motions are transmitted instantaneously, “just as pulling one of the ends of a very taut cord makes the other end move at the same instant” (Descartes 2001: 89; AT 6:11). Although these motions produce images in the brain, there is no

reason to think that these images resemble the objects that produced the motions in all ways.

[W]e must at least observe that there are no images that must resemble in every respect the objects they represent – for otherwise there would be no distinction between the object and its image – but that it is sufficient for them to resemble the objects in but a few ways, and even that their perfection frequently depends on their not resembling them as much as they might. For example, you can see that engravings, being made of nothing but a little ink placed here and there on the paper, represent to us forests, towns, men, and even battles and storms, even though among an infinity of diverse qualities which they make us conceive in these objects, only in shape is there actually any resemblance. And even this resemblance is a very imperfect one, seeing that, on a completely flat surface, they represent to us bodies which are different heights and distances, and even that following the rules of perspective, circles are often represented by ovals rather than by other circles; and squares by diamonds rather than by other squares; and so for all other shapes. (Descartes 2001: 89–90; AT 6:113)

Once again, Descartes invoked the model of the blind man with his stick to make his claim plausible.

From considering sensation in general, Descartes turned to vision. In order to understand how vision takes place, he began by investigating how images are formed on the back of the eye. Going beyond Kepler's explanation, which was based on an analogy between the eye and a camera obscura (basically a pinhole camera that had been used by artists depicting perspective), Descartes based his discussion of the images that form on the back of the eye on the dissection of eyes – either “of a newly deceased man, or, for want of that, of an ox or some other large animal” (Descartes 2001: 91; AT 6:115).

Following Kepler's strategy of using a point-by-point analysis of both the object and the retinal image, Descartes traced light rays from points on the object to points on the surface of the retina at the back of the eye (Ribe 1997: 52). The rays must pass through several interfaces between different media within the eye, undergoing refraction at each of these surfaces. Using the law of refraction and techniques of tracing rays, Descartes showed how an image of the object is produced on the surface of the retina. He claimed he could then show how this image could be transported to the interior surface of the brain. “And from there I could again transport it right to a certain small gland [the pineal gland] which is found about the center of these concavities, and which is strictly speaking the seat of the common sense” (Descartes 2001:100; AT 6:129). Derived from a tradition going back to Aristotle, the common sense was thought to be an organ in which data from all the senses are integrated into a unitary signal which causes conscious awareness. Descartes located the common sense in the pineal gland, which also served as the connection between mind and body (Cottingham 1993: 38).

As an aside, he added an explanation of a phenomenon commonly accepted by early modern natural philosophers:

I could even go still further, to show you how sometimes the picture can pass from there through the arteries of a pregnant woman, right to some specific member of the infant which she carries in her womb, and there forms these birthmarks which cause learned men to marvel so. (Descartes 2001: 100; AT 6:129)

Harking back to the opening chapter of *The World* and anticipating his fully developed epistemology and metaphysics of the *Meditations* and the *Principles*, Descartes insisted on the difference between our sensations and the objects that cause them.

Now although this picture, in being so transmitted into our head, always retains some resemblance to the objects from which it proceeds, nevertheless, as I have already shown, we must not hold that it is by means of this resemblance that the picture causes us to perceive the objects, as if there were yet other eyes in our brain with which we could apprehend it; but rather, that it is the movements of which the picture is composed which, acting immediately on our mind inasmuch as it is united to our body, are so established by nature as to make it have such perceptions. (Descartes 2001: 101; AT 6:130)

That “there need be no resemblance between the ideas that the mind conceives and the movements which cause these ideas” is evident from the fact that a blow to the eye will produce sensations of flashing lights, whether the eyes are open or closed, in the light or in the dark (Descartes 2001: 101–2; AT 6:131). He proceeded to show how all the objects of sight – light, color, location, distance, size, and shape – result from the geometrical properties of the eye and movements in the optic nerves. He also explained how judging distance, shape, size, and color can be mistaken. For example, we can be mistaken in judging the location of perceived objects “because the impressions which come from without pass to the common sense by way of the nerves, if the position of these nerves is constrained by some extraordinary cause, it can make us see objects in places other than where they are” (Descartes 2001: 108; AT 6:141).

Descartes devoted the last four discourses of the *Optics* to an analysis of lenses. Using the law of refraction to demonstrate the effects of lenses of various shapes on rays of light, he showed how lenses of particular shapes could perfect vision. Part of this analysis involved studying the shape of the human eye to explain the causes of myopia and far-sightedness. Although lenses had been used for centuries to correct vision, no one understood just how they worked. The choice of lenses for spectacles had been simply a matter of trial and error. Using the law of refraction, Descartes was the first to explain how lenses work to correct defects of vision. An important part of his explanation involved determining the anaclastic curves, that is the shape of the refracting surfaces that will focus parallel rays at a single point. Descartes worked out the calculations in the *Geometry* and used the results in the *Optics* in his discussion of lenses (Ribe 1997: 44).

He applied the same methods to explain the workings of the telescope. Arguing that hyperbolic rather than spherical lenses would improve the function of telescopes, he described the design for an improved version of this new technology. Grinding such lenses, however, demanded new methods, and Descartes devoted the concluding chapter of the *Optics* to the design of a new machine that could produce hyperbolic lenses.

Meteorology (1637)

One important property of light that Descartes did not address in the *Optics* is color. He addressed the production of colors as part of his explanation of the rainbow in another

one of the *Essays* published with *The Discourse on the Method*, the *Meteorology*. Bearing the same title as Aristotle's treatise *Meteorology*, this essay addressed questions about the terrestrial realm – the nature of matter, vapors, salt, weather, the rainbow, halos around the sun, and parhelia or the appearance of multiple suns. He opened the work with a brief repetition of his theory of matter, arguing for its merits by noting that he no longer needed to appeal to substantial forms and real qualities, thus offering a more parsimonious system for explaining the phenomena of the world.

The rainbow provided Descartes with a particularly dramatic example by which to demonstrate the power of his natural philosophy.

The rainbow is such a remarkable phenomenon of nature, and its cause has been so meticulously sought after by inquiring minds throughout the ages, that I could not choose a more appropriate subject for demonstrating how, with the method I am using, we can arrive at knowledge not possessed at all by those whose writings are available to us. (Descartes 2001: 332; AT 6:325)

In referring to previous attempts to explain the rainbow, Descartes was alluding to a long tradition, stemming from Aristotle and progressing through the Middle Ages, of discussions of this phenomenon.

From the time of Aristotle, philosophers, astronomers, and natural philosophers had attempted to explain several features of rainbows: their cause, their shape, their size, and the origin of their colors. During antiquity and the Middle Ages, the basic geometry of the rainbow was known, in particular the facts that the rainbow is circular and that the maximum height of the rainbow is 42° as measured by the angle formed by the line from the eye of the observer to the center of the rainbow and the line from the eye of the observer to the top of the rainbow. Another notable fact is that rainbows are visible only when the sun is opposite the clouds and rain and only when the sun is fairly low in the sky. Aristotle and a number of medieval thinkers had attempted to explain the size and shape of the rainbow in terms of various combinations of reflections and refractions of sunlight from a mass of clouds and raindrops.

Theodoric of Freiburg (d. ca. 1310) developed innovative ideas about the rainbow based on experimental work. Probably influenced by Alhazen's and Witelo's point-by-point analysis of light and vision, he thought that the rainbow was caused by the reflections and refractions of sunlight within individual raindrops (Ribe 1997: 45). In order to explore the behavior of light within the drops, he used a spherical bowl of water as a model of the rainbow and traced the path of rays of light as they entered the drop, were refracted at its surface, and then were reflected off the back of the drop, undergoing another refraction on exiting the drop. Using this procedure, he determined empirically the angles at which the rainbow is visible and the angles at which particular colors are visible. He was also able to explain the formation of the secondary rainbow, as the result of an additional reflection within drops that are higher in the sky than those that produce the primary rainbow. He wrote a book about this work, *De iride et radialibus impressionibus* (*On the rainbow and observed rays*), a book that runs to a couple of hundred printed pages in modern editions (Boyer 1959: 110–25).

Whether or not Descartes was aware of Theodoric's theory, his approach to the rainbow in the *Meteorology* is remarkably similar to that of the medieval writer. He

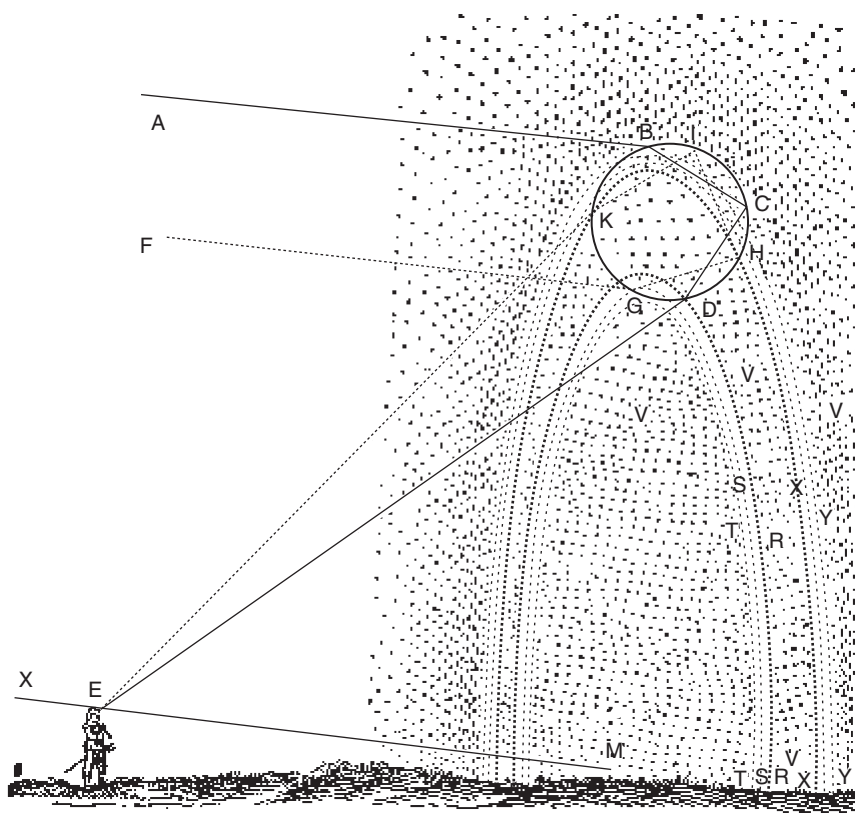


Figure 8.3

began by using a spherical glass vessel to study the behavior of light in individual raindrops (see figure 8.3). Recounting experiments with a transparent flask, he continued with similar measurements at different places in the sphere of water, getting results similar to Theodoric's.

Like Theodoric, Descartes traced the path of the rays in the individual drops. He worked out the paths that the light followed in both primary and secondary rainbows, concluding that "the primary rainbow is caused by rays which reach the eye after two refractions and one reflection, and the secondary by other rays which reach it only after two refractions and two reflections" (Descartes 2001: 334; AT 6:329). This analysis explains why the secondary rainbow is less bright than the primary and also why its colors appear in the reverse order.

This experimental work enabled Descartes to account for the geometrical properties of the rainbow. There remained the question of why the rainbow exhibits colors. Like virtually all writers since Aristotle – including Descartes's younger contemporaries Francesco Grimaldi (1618–63), Robert Boyle (1627–91), and Robert Hooke (1635–1703) – Descartes thought that colors result from modifications of white light (Westfall 1962). Once again using the model of balls, he explained color as the result of spin on the particles transmitting light. When the spin is faster than the forward motion of

the particles, the light appears stronger, the strongest color being red; when the spin is slower than the forward motion of the particles, the light appears blue, the weakest color being violet. The refractions that the light undergoes as it enters and leaves the raindrops affect the spin on the particles, thus producing the colors of the rainbow.

***Principles of Philosophy* (1644)**

Light plays a less significant role in the *Principles of Philosophy* – the book Descartes hoped would be adopted in the Jesuit colleges to replace the Scholastic texts on natural philosophy still in use – than it did in his earlier writings. Rather than dealing with specific issues in detail, as he had in the *Essays* accompanying the *Discourse on the Method*, Descartes set out his new philosophy of nature in the *Principles*. He based his mechanical philosophy on what he thought were secure metaphysical foundations and showed how every aspect of traditional natural philosophy could be incorporated into his scheme. In this way, the book is comparable to other major treatises on natural philosophy at the time (Osler 2002).

In this context, Descartes's concern was largely to incorporate light into his general philosophy of nature and cosmology. Accordingly, he tried to explain how the sun and stars produce light. Dropping the hypothetical approach that characterized his discussion of the three models in the *Optics*, he stated that light is a force (*vis*) or tendency (*conatus*) that the particles comprising these luminous bodies have to recede from the centers about which they revolve. According to his cosmology, each heavenly body is located at the center of a vortex or whirlpool of matter. The vortices produce pressure outward from their centers, a centrifugal force. This force, in turn, puts pressure on the particles of the second matter that fill all space. Hence, we see light coming from the centers of the vortices of these heavenly bodies, and we know that it is propagated instantaneously, just as pressure is. Although Descartes alluded to some of the results he published in *La dioptrique* and discussed the propagation of light in the heavens, in the *Principia philosophiae* he did not add any new results about optics or vision to those published in his earlier books.

Conclusion

The study of light and vision played a central role in Descartes's philosophy. Directly connected to his cosmology, physics, and theory of perception, it was one of the most thoroughly developed aspects of his mechanical philosophy. Subsequent natural philosophers took up questions about light, often starting from the Cartesian account. Descartes's discovery of the law of refraction stimulated a search for proofs based on fundamental principles of mechanics. Pierre de Fermat (1601–65) sought to deduce the law of refraction from one of the oldest assumptions guiding the study of nature: that nature does nothing in vain. Fermat interpreted this principle to mean that processes would occur in the least time. Somewhat later in the century, Christiaan Huygens (1629–95) demonstrated how the law followed from his own wave theory of light. Further controversies about how to establish this important law were central

to debates between wave and particle theorists in the eighteenth century (Sabra 1967: 136–58).

With regard to colors, virtually all natural philosophers shared with Descartes the traditional Aristotelian claim that colors result from the modification of white light. Where Descartes thought the spin on the particles of light was modified to produce colors, others appealed to other mechanisms. For example, the Jesuit thinker Francesco Maria Grimaldi (1618–63) believed that colors result from the differential compression of the vibrating fluid that he regarded as the cause of light. Similarly, Robert Hooke explained colors in terms of the dilution of red and blue light, which he considered to be primary colors (Oldroyd 2000). Isaac Newton (1642–1727) overturned this traditional assumption with his famous experiment with light and colors, published in the *Philosophical Transactions of the Royal Society* in 1671/2, by demonstrating that white light consists of irreducible colored rays (Westfall 1962).

Descartes's optics not only played a central role in the development of his own system of natural philosophy, but it also stimulated important lines of research in the decades that followed.

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Part III

Epistemology and Metaphysics

Chapter 9

Descartes's Method

MURRAY MILES

Introduction

While it is doubtless true that Descartes, like many a mathematical genius before and after him, was deeply imbued with “the spirit of geometry” (Pascal), this implies neither that he embraced a deductivist model of science as a formal, axiomatized system, nor that he regarded “quantity and number” (Hume) as the sole objects of properly scientific inquiry. On the contrary, Descartes’s vision of a unified system of the sciences stands in sharp contrast to that geometrical ideal which has bound its spell on mathematically minded philosophers from Pythagoras and Plato to Spinoza, Hobbes, and Russell. He distinguished, after all, the *synthetic method of proof* by which theorems are deduced from self-evident definitions, axioms, and postulates from that *analytic method of discovery* by which those same theorems (together with the definitions and axioms themselves) were first brought to light by their original discoverers. It was through his early work in mathematics that Descartes became acquainted with the analytic method, and it was in this field that he first became adept at it (cf. CSM 1:120ff.; AT 6:19ff.); but its full range and significance only became clear to him later, when he employed it to establish the first principle of his metaphysics, “I think, therefore I am” (hereafter: the *cogito*). It is accordingly to certain objections to Descartes’s founding principle that we turn our attention first, and not (as is customary) to his official pronouncements on method in the *Regulae* (especially Rules 4 through 8) and the *Discourse* (cf. 1:120; AT 6:18f.).

The Intuitive, the Discursive, and the Ratiocinative

The *cogito* is the target of an instructive criticism by the authors of the Sixth Set of Objections to the *Meditations*. In order to know that one thinks and exists, they argue, one must first know what thinking and existence are; but one cannot possibly know what thinking is, since to do so would require an infinite series of mental acts directed upon other acts (cf. 2:278; AT 7:413). To this Descartes replies that one’s certainty that one is thinking indeed presupposes knowledge of “what thought is and what existence is. But,” he continues,

this does not require reflexive knowledge . . . much less knowledge of reflexive knowledge, i.e., knowing that we know and knowing that we know that we know and so on *ad infinitum*. This kind of knowledge cannot possibly be obtained about anything. It is quite sufficient that we should know it by that inner cognition which always precedes reflexive knowledge (*cognitio illa interna, quae reflexam semper antecedit*) and which is so innate in all men that, although we may pretend that we do not have it if we are overwhelmed by preconceived opinions (*praejudicia*) and pay more attention to words than to their meanings, we cannot in fact fail to have it [i.e., to know what thought and existence are]. (2:285; 7:422)

A related objection to the primitiveness of the *cogito* occurs in *The Search for Truth*. Descartes's spokesman, Eudoxus, concedes "that we must know what doubt is, what thought is, what existence is" (2:417; AT 10:523) in order to be certain of the *cogito*. "But do not imagine," he warns, "that in order to know what these are, we have to rack our brains trying to find the 'proximate genus' and the 'essential differentia' which go to make up their true definition" (*ibid.*). Such scholastic definitions by proximate genus and specific difference are quite unnecessary. Eudoxus continues:

I would never have believed that there ever existed anyone so dull that he had to be told what existence is before being able to conclude and assert that he exists. The same applies to doubt and thought. Furthermore, no one can learn such things or be persuaded of them otherwise than through his own experience and that *consciousness or internal testimony* (*conscientia, vel interno testimonio*) which everyone experiences within himself . . . [I]n order to know what doubt and thought are, all one need do is to doubt or to think. That tells us all it is possible to know about them, and explains more about them than even the most precise definitions. (*Ibid.*; emphasis added)

What Descartes calls (1) "inner cognition," "inner consciousness," and "internal testimony" is set over against two different mental processes in these passages. In the first it is contrasted with (2) second- and higher-order acts of thinking about thinking (about thinking, and so forth), in the second with that (3) discursive analysis through which the logical relations among genera and species are discerned and embodied in formal definitions. In Descartes's reply to yet another objection to the primitiveness of the *cogito*, immediate inner cognition is distinguished from a different mental process. According to this further objection, the *sum* is the conclusion of a (4) syllogism, the premises of which are "whatever thinks, exists" (major) and "*cogito*" (minor). Hence, objects Gassendi (2:271; AT 9A:205), the certainty of one's own existence is not a primitive truth at all, but depends on the prior knowledge of the universal major.

Now, for Descartes, syllogistic reasoning is a ratiocinative process, while the *cogito* is intuitive. He conveys this point graphically in a letter to the Marquis of Newcastle of March or April 1648:

Will you not grant me that you are less assured of the presence of the objects that you see than of the truth of this proposition: I think, therefore I am. Now this knowledge is by no means the work of your reasoning nor something which your masters taught you; your mind *sees* it, *feels* it, *handles* it. (3:331; AT 5:138; emphasis added)

Descartes stresses the intuitive character of such knowledge again in his Replies to the Second Set of Objections, the authors of which (like Gassendi) fail to distinguish the intuitive certainty of the *cogito* from deductive logical inference, charging that the *cogito* cannot be relied upon without prior knowledge of God, who guarantees all such inferences (cf. 2:89; AT 7:124f.). The reply is that, while this is true for the conclusions of deductive arguments recalled in isolation from their premises, the *cogito* is no such argument:

[W]hen we become aware that we are thinking things, this is a primary notion, as it were, which is not derived by means of any syllogism (*ex nullo syllogismo*). When someone says "I am thinking, therefore I am, or I exist," he does not deduce existence from thought by means of a syllogism (*per syllogismum*), but recognizes it as something self-evident by a simple intuition of the mind (*simplici mentis intuitu*). This is clear from the fact that if he were deducing it by means of a syllogism, he would have to have had previous knowledge of the major premise "Everything which thinks is, or exists"; yet in fact he learns it from experiencing in his own case (*apud se experiatur*) that it is impossible that he should think without existing. It is in the nature of our mind to form general propositions out of knowledge of particulars. (2:100; AT 7:140f.)

The operative distinction here is obviously that between (a) intuitive knowledge (*intuitus*) acquired through immediate inner experience of a single item (in this case, one's own existence) and (b) knowledge acquired through logical deduction or syllogistic inference as a ratiocinative process. In the final sentence, this distinction recurs as that between (a) knowledge that begins from particulars, proceeding thence to the general, and (b) knowledge that proceeds from the general to the particular (or less general) in the manner of deductive or syllogistic reasoning. What is the exact nature of (a), the process whereby the mind "forms" primary notions and axioms or first principles on the basis of prior knowledge of particulars, a process that Descartes regards as revealing the very nature of the human mind? Does it take place *within* pre-discursive and pre-ratiocinative knowledge itself, such that the universal is immediately *intuited* in the particular? Or is it rather a process of transition *from* one to the other, the universal being graspable only in and through the discursive or ratiocinative operations of the mind? We shall see that the former is the correct alternative and that this sheds valuable light not just on Descartes's attitude toward formal logic and the synthetic method, but on the analytic method of discovery that he describes as "the truest method of instruction," it having been this method "alone" that he employed in his *Meditations* (2:111; AT 7:156).

The Order of Intuition

That the knowledge of first principles of all kinds involves a progress of the mind *within* intuition is suggested by Descartes's reply to Burman's charge of inconsistency between the remark in the Second Replies that our awareness of ourselves as thinking things is not derived from any syllogism (*ex nullo syllogismo*) and the following passage from *Principles* I, 10:

And when I said that the proposition “I am thinking, therefore I exist” is the first and most certain of all to occur to anyone who philosophizes in an orderly way, I did not, in saying that, deny that one must first know what thought, existence, and certainty are, and that it is impossible that that which thinks should not exist, and so forth. But because these are very simple notions, which on their own provide us with no knowledge of anything that exists, I did not think they needed to be listed. (1:196; AT 8A:8)

Although the principle “whatever thinks, exists” is *universal* and is here allowed to be *prior* to the *cogito* in some sense, the priority is neither said nor implied to be the *logical* priority of a universal major to a particular conclusion within a syllogistic inference. That is why one can legitimately wonder whether this passage is indeed inconsistent with the other.¹ If we consider the phrase *ex nullo syllogismo* alone, which is all Burman cites, it is not; whereas if we take the whole passage into consideration, there does seem to be a fundamental inconsistency. For the passage from the Second Replies not only denies that the *cogito* is derived from a previously known universal proposition by means of a syllogism, but also, in its final sentence, that knowledge of particulars, of which it is an instance, depends upon prior knowledge of the general *in any sense at all*, our mind being “so constituted by nature that general propositions are formed out of the knowledge of particulars.” The *Principles*, on the other hand, assert clearly that the *cogito* depends upon the “simple” or *universal* notions “thought,” “existence,” and “it is impossible that that which thinks should not exist.”

Though the evidence is insufficient to determine exactly where Burman thought the contradiction lay, there is a certain way of construing the difficulty that seems to accord best with Descartes’s response. Suppose Burman found this passage inconsistent with the phrase *ex nullo syllogismo* because he was at a loss to conceive the priority of the general “whatever thinks, exists” to “I think, therefore I am” otherwise than on the syllogistic model. To remove this difficulty, it would be enough to draw attention to a different form of derivativeness and dependence among items within the order of intuition itself. This is the course that Descartes in fact adopts.

His reply falls into three parts. The first makes it clear that he takes Burman to understand *Principles* I, 10 as asserting a logical dependence of the *cogito* on certain general notions and principles:

Before this conclusion, “I am thinking, therefore I exist,” the major “whatever thinks, exists” can be known; for it is in reality prior to my inference, and my inference depends on it. That is why the author says in the *Principles* that the major premise comes first, namely because implicitly it is always presupposed and prior. (3:333; AT 5:147)

The obvious force of this is to allow that the *Principles* assert, as Burman correctly supposes, the dependence of the *cogito* on the principle “whatever thinks, exists,” and to endorse that assertion. The further assumption that the dependence is logical in nature is evoked by the use of the terms “conclusion” and “major,” but *not* endorsed, since the second part of the reply explains the quite different sense in which knowledge of the *cogito* depends on certain universal notions and principles:

But it does not follow that I am always expressly and explicitly aware of its priority [*scil.* that of the “major,” “whatever thinks, exists”], or that I know it before my inference. This is because I am attending only to *what I experience within myself (in me experior)*, for example, “I am thinking, therefore I exist.” I do not pay attention in the same way to the general notion “whatever thinks, exists.” As I have explained before, we do not separate out these [general] propositions from the particular instances; rather it is *in particular instances* that we think of them. This then is the sense in which the words cited here [*ex nullo syllogismo*] should be taken. (3:333; AT 5:147; emphasis added)

The phrase “as I have explained before” refers to a distinction drawn earlier between “common principles and axioms” considered “in the abstract, or apart from material things and particular instances” (3:332; AT 5:146), and those same principles and axioms as they are known in and through particulars. It is important to consider this third part of Descartes’s reply to Burman in interpreting the second. Speaking of the First Meditation, Descartes notes that

the author is considering at this point a man who is only just beginning to philosophize and who is paying attention only to what he knows himself to know. As regards the common principles and axioms, for example, “It is impossible that one and the same thing should both be and not be,” men who are creatures of the senses (*homines sensuales*), as we all are at a pre-philosophical level, do not consider these or pay attention to them. On the contrary, since they are present in us from birth with such clarity, and since we experience them within ourselves (*in semetipsis experiuntur*), we neglect them and think about them only in a confused manner and never in the abstract, or apart from material things and particular instances. (3:332; AT 5:146)

Clearly, the chief distinction put to work in the reply to Burman is that between implicit and explicit knowledge. In the second part, Descartes contrasts explicit knowledge of my own particular thought and existence (the *cogito*) with implicit knowledge of certain general principles having no existential import, for example, “whatever thinks, exists”; and in the third, a parallel distinction is drawn between two kinds of knowledge of *general* propositions: implicit knowledge of universal principles *in concreto*, as instantiated “in particular instances,” and explicit knowledge of those same principles considered “in the abstract, or apart from material things and particular instances.” That is the point of the reference to the common man (*homo sensualis*) who does not attend to these general principles: as long as he is conscious of his thinking, he cannot fail to experience them within himself, that is, to know them implicitly, since they are inborn (*innata*). Not having attended to them, he is apt to deny these principles when they are brought to his attention; not so, however, one who applies his mind to them attentively (*attente ad illa animadvertit*). Even he “who is only just beginning to philosophize” expressly attends only to “what he knows himself to know” (*scit se nosse*), overlooking the simple notions and innate principles of the natural light that he knows without knowing that he knows them. And when, no longer a pure beginner, he grasps the *cogito* explicitly, that is, both experiences it in himself and attends to that which he experiences, he still does not attend to the general principle “whatever thinks, exists” or the simple notions “thought,” “existence,” “certainty,”

and so forth. These he experiences, just as he does the particular *cogito*, yet without knowing them explicitly and “in separation” from the latter. That comes only later in an order of philosophizing.

Summing up, three things are distinguished in the reply to Burman: (1) implicit knowledge of certain simple and universal notions and principles having no existential import (“thinking,” “existence,” “whatever thinks, exists,” etc.), (2) explicit knowledge of the *particular* existential truth “I think, therefore I exist,” and (3) *explicit* knowledge of those same universal notions and principles referred to under (1). All three are successive stages within the order of intuition itself. Accordingly, Burman’s difficulty resolves itself as follows. The *Principles* assert that (1) is prior to (2), and in the first part of his reply to Burman Descartes confirms that (2) really is dependent upon (1). The Second Replies, however, state that no syllogism, no reasoning is involved, since it is in the nature of the mind to proceed from the particular to the universal, that is, as the second part of the reply to Burman makes clear, from (2) the explicit knowledge of the *cogito* to (3) the explicit knowledge of the logical, mathematical, and metaphysical principles of the natural light, the eternal truths implicitly contained in it, including “whatever thinks, exists.” Nevertheless, (1), (2), and (3) all belong to the order of intuition; in question is direct insight, inner experience, internal testimony accompanied by varying degrees of attention to the intuited; *not* in question are (4) discursive or ratiocinative processes of the kinds mentioned previously.²

If this is correct, then the task of reconciling the Second Replies and *Principles* I, 10, while showing that the *cogito* cannot be a syllogism with a suppressed major premise, falls principally to the implicit-explicit distinction.³ The reply to Burman thus brings to light a characteristic “movement” (cf. Hoenen 1937) or “inference” of the mind *within* pre-discursive or intuitive knowledge itself: the mind’s progress from the implicit understanding of certain simple notions and universal principles to the explicit philosophical (though still purely intuitive) grasp of those very notions and principles *in abstracto*. The process consists in attending explicitly to what is only implicit in the mind’s intuitive certainty that it thinks and therefore exists. In such *reflexive attention* (1) implicit (innate) knowledge of abstract notions and universal principles makes possible (2) *explicit* knowledge of one’s own *particular* thinking and existence *in concreto*. The latter, in turn, makes possible (3) an explicit grasp of those same notions and universal principles *in abstracto*. This entire reflexive process or progress of the mind is intuitive; it is independent of (4) the discursive and ratiocinative employment of abstract notions and principles in Scholastic definitions and in deductive reasoning, since (3) makes (4) possible.

In view of its role within the analytic method of discovery, this reflexive attention to one’s own thinking may be called “analytic reflexion” or “reflexive analysis” in order to distinguish it not just from logical reflexion (whether discursive or ratiocinative) but also from reflexion in the sense of second- and higher-order acts directed upon acts (see the reply to the Sixth Set of Objections that begins the section following the Introduction). In view of the obvious similarity to what Aristotle called “exhibiting the universal by making it manifest in the particular” (*Posterior Analytics* 71a), analytic reflexion may also be fittingly called “intuitive induction.” The exact difference between intuitive induction or analytic method, on the one hand, and logical deduction or synthetic method, on the other, is the subject of the next section.

Analytic and Synthetic Method

The preceding account of the intuitive progress of the mind in analytic reflexion explains in large measure Descartes's ambivalent attitude toward formal logic and the synthetic method of proof. In the Preface to the *Principles* he distinguishes "the logic of the Schools" from "the kind of logic which teaches us to direct our reason with a view to discovering the truths of which we are ignorant" (1:186; AT 9A:13f.). The latter is none other than the analytic method (in Popper's phrase, "the logic of scientific discovery"). As for the former, Descartes's comments on the synthetic method, while generally scornful, are at times tinged with a element of genuine recognition. He consented, after all, to set out certain of his doctrines in synthetic order (the obvious example being the *more geometrico* proofs appended to the Second Replies), and the *Principles* as a whole are cast in a form that he himself describes as "synthetic" (3:338; AT 5:153).⁴ Though the synthetic order of reasoning, proceeding from the general to the particular, differs from the analytic order of discovery followed in the *Meditations*, it is not without utility, Descartes realized, to reflect discursively upon that which was first intuited and then made explicit through careful attention to the intuited; for discursive and ratiocinative procedures in definitions and syllogistic reasoning can clarify the logical relations among those concepts and principles first grasped implicitly in intuition and then made explicit through analytical reflexion. This is a far cry from the often empty definitions and barren proofs based on merely probable premises to which Descartes refers contemptuously as "dialectics." It is worth noting the more balanced tone of his reply (partly cited earlier) to Gassendi's objection to the primitiveness of the *cogito*:

But the most important mistake our critic makes here is the supposition that knowledge of particular propositions must always be deduced from universal ones, following the same order as that of a syllogism in dialectics. Here he shows how little he knows of the way in which we should search for truth. It is certain that if we are to discover the truth we must always begin with particular notions in order to arrive at general ones later on (*though we may also reverse the order and deduce other particular truths once we have discovered general ones*). (2:271; AT 9A:205f.; emphasis added)

There is a more important reason for Descartes's grudging recognition of the synthetic method, however. It cannot be said that those whom Descartes calls "dialecticians" do not employ the method of analysis at all. On the contrary, wherever their use of syllogisms and synthetic order does in fact lead to new knowledge of conclusions that are certain, this is due to the fact that their premises were such as already contained the conclusion in the manner of *that which is already known implicitly*. Thus, in the *Regulae* Descartes writes:

[T]o make it even clearer that the aforementioned art of argumentation [i.e., dialectics] contributes nothing to our knowledge of the truth, we should realize that, on the basis of their method, dialecticians are unable to formulate a syllogism with a true conclusion *unless they are already in possession of the matter of the conclusion*, i.e., *unless they have previous knowledge of the very truth deduced in the syllogism*. (1:36f.; AT 10:406; emphasis added)

The point here is not that made later by John Stuart Mill (and no doubt already well known to Descartes from Sextus Empiricus and the Renaissance skeptics), that syllogistic reasoning is inherently circular since knowledge of the truth of the particular conclusion is a necessary condition of knowing the truth of the universal major (cf. Curley 1978: 26f.). The reply to Gassendi suggests that Descartes's antiformalism rests, not on formal considerations like these, but on his conception of the nature of the human mind. If so, then the purport of the concluding unless-clause is that, *qua dialectician*, the practitioner of the art of logical deduction is incapable of discovering any truth not already implicit in his premises (though yet to be explicitly discovered there). By starting from probable premises and proceeding syllogistically, the dialectician "contributes nothing [new] to our knowledge of truth." If, however, he starts from natures and axioms immediately intuited through reflexion on his own thinking, explicating in the universal major and particular conclusion only what is already implicitly contained in the premises regarding simple natures and the relations between them, then, even though he may present his arguments in what is outwardly the synthetic order, he will contribute positively to the growth of human knowledge – although not through his knowledge of syllogistic patterns, that is, not *qua dialectician*.⁵

The merely negative point of the *Regulae* passage cited above is reiterated in Rule 14 where, however, instead of suggesting that the synthetic order may foster and promote the analytic method of discovery (at least *per accidens*), Descartes treats it as a positive hindrance:

. . . the syllogistic forms are of no help in grasping the truth of things. So it will be to the reader's advantage to reject them altogether and to think of all knowledge whatever – save knowledge obtained through simple and pure intuition of a single, solitary thing – as resulting from a comparison between two or more things. In fact, the business of human reason consists almost entirely in preparing the mind for this operation. For when the operation is straightforward and simple, we have no need of a technique to help us *intuit* the truth which the comparison yields; all we need is *the light of nature (naturae lumine)*. (1:57; AT 10:439f.; emphasis added)

Thus, though logic may at times aid and complete, more often than not it threatens to distract us from, the true "business of human reason." Accordingly, Descartes is constantly vacillating in his estimate of the value of formal logic.

The talk of the "business" of reason calls to mind Descartes's picturesque metaphor for the Scholastic method of demonstration: reason "taking a holiday."

Some will perhaps be surprised that . . . we make no mention of any of the precepts with which the dialecticians suppose they govern human reason. They prescribe certain forms of argumentation in which the conclusions follow with such irresistible necessity that if our reason relies on them, even though it takes, as it were, a holiday (*ferietur*) from *considering a particular inference clearly and attentively*, it can nevertheless draw a conclusion that is certain *merely in virtue of the form*. (1:36; AT 10:405f.; emphasis added)

By contrast with this, what Descartes terms "discernment in the methodical deduction of one thing from another" (1:33; AT 10:400) might be called "reason at work," busily elaborating through careful attention to that of which one is *already implicitly*

aware the whole network of interconnections among simple or primitive ideas and truths, as well as those that follow from them in logic. And just as it sometimes falls to the dialectician's lot (though only *per accidens*) to put his reason to work, so it is at times the mathematician's fate to lapse into sterility through failure to exercise his reason:

For there is really nothing more futile than so busying ourselves with bare numbers and imaginary figures that we seem to rest content in the knowledge of such trifles. And there is nothing more futile than devoting our energies to those superficial proofs which are discovered more through chance than method and which have more to do with our eyes and imagination than our intellect; for the outcome is that, in a way, we *get out of the habit of using our reason*. (1:18; AT 10:375; emphasis added; cf. also 1:119f.; AT 6:17f.)

This lax practice is immediately contrasted with cultivating "certain primary seeds of truth naturally implanted in human minds" (1:18; AT 10:376), that is, with exercising "the light of the mind" (*mentis lumen*) itself. That this refers to the analytic method of discovery, to reflexion through which the implicit becomes explicit, should be obvious by now.

Exactly how Descartes's method of analytic reflexion differs from logical methods of deductive derivation based on the logical form of propositions (quantifiers and logical connectives) and on definitions of the non-logical terms can perhaps be best clarified as follows. The purely logical analysis of concepts and truths can itself be correctly described as rendering explicit what is initially only implicit. It does so, however, differently than the method of analytic reflexion. For that which is implicit in the manner of an implicit *logical* consequence of the known need not itself be known, even implicitly. Thus, given the logic of the word "knows," "*x* knows *p*" entails that *p* is true; and if "*p*" entails "*q*," then "*x* knows *p*" also entails "*q*." But it does *not* imply "*x* knows *q*" or that *x* has ever had any idea of *q*, even an implicit or vague one.⁶ This, however, is precisely what is entailed when *a* (some thought) contains *b* (a certain idea or principle) implicitly *as capable of being made explicit through analytic reflexion*. By such non-logical reflexion the mind does not first come to know something of which it was formerly completely unaware; it becomes explicitly aware of what it already *knows*, though only implicitly, that is, without having ever *attended* to the fact that it knows it. Thus, in the Seventh Replies, Descartes remarks: "My principal aim has always been to draw attention to certain very simple truths which are innate in our minds, so that as soon as they are pointed out to others, they will not consider that they were ever ignorant of them (*non putat se illas unquam ignorare*)" (2:312; AT 7:464).

From this it appears that discursive and ratiocinative logical reflexion must be regarded as (quite literally) "syn-thetic," since by their means the mind actually acquires something new, augments its existing stock of knowledge by adding something that it had not formerly grasped at all, not even implicitly. Although implicitly *contained* in the premises from which it is derived logically, prior to their actual derivation such truths were not *known or grasped* at all, not even vaguely or implicitly. By contrast, attending reflexively to what is already implicit in one's thinking, to what one knew without knowing that one knew it, should be called analytic rather than synthetic; for through such reflexion no new knowledge is acquired except the second-order knowledge that one already knew implicitly something one now knows explicitly. This is Descartes's

use of “analysis” and its cognates. It remains now only to show (1) that the analytic method of discovery coincides in all the essentials with the process of analytic reflexion described above and (2) that it is the method by which the natural light of reason is extended from pure to applied mathematics (the special sciences) and even to metaphysics itself, that is, the metaphysical knowledge of God and the soul. These are the tasks of the next two sections, respectively.

Method and the Mathematical Ideal

The process by which we become aware of what we know without knowing that we know it contrasts starkly with those formal methods or procedures that simply ignore the “seeds of truth” (1:18; AT 10:376) within us. Yet Descartes’s analytic method of discovery is not just a means of discovering first principles as starting points; it is also a method of advancing to other truths of a derivative nature (see also Kemp Smith 1952: 20; and Buchdahl 1969: 130). It thus combines (a) the uncovering of simple or primitive notions and truths with (b) the unfolding of more complex truths implicit in those “seeds of truth” originally implanted in the mind by God. Since, as we have seen, discursive and ratiocinative operations can aid in advancing from the starting point to derivative truths, synthesis goes closely together with analysis. Accordingly, in the run-up to the *more geometrico* proofs of the Second Replies, Descartes remarks:

I make a distinction between two things which are involved in the *modo scribendi geometrico*, the order, and the manner of demonstration (*ratio demonstrandi*):

The order consists simply in this. The items which are put forward first must be known entirely without the aid of what comes later; and the remaining items must be arranged in such a way that their demonstration depends solely on what has gone before. I did try to follow this order very carefully in my *Meditations* . . . As for the manner of demonstration, this divides into two varieties: the first proceeds by analysis and the second by synthesis. (2:110f.; AT 7:155f.)

Synthesis, Descartes goes on to explain, involves “a long series of definitions, postulates, axioms, theorems and problems, so that if anyone denies one of the conclusions it can be shown at once that it is contained in what has gone before” (*ibid.*). Analysis, by contrast, “contains nothing to compel belief in an argumentative or inattentive reader” who “fails to attend to even the smallest point,” there being “many truths which, although they must be attended to, are scarcely touched upon, since they are clear to anyone who pays attention” (*ibid.*). In the synthetic mode, one lays out first those things that are first in themselves, making them explicit at the outset in universal definitions, axioms, and postulates before deducing theorems and problems from them. One thus proceeds “*a posteriori*” (*ibid.*), working back from effect to cause, that is, from the conclusions (theorems) to be proved to the grounds for them (premises). Analysis, by contrast, starts from what is first for us, namely particular truths intuitively grasped in inner experience, proceeding thence to the universal concepts and axioms that careful attention reveals as already implicit in them. Though cognitively prior in themselves, the latter are disclosed through analytical reflexion only later, whence

synthesis, which sets them out explicitly in the first place, is in a way “more *a priori*” (*ibid.*) than analysis. However, analysis too is *a priori* insofar as it starts from truths first for us and proceeds via others discovered later (yet first in themselves) to an intuitive grasp of still further items of knowledge likewise implicit in these first truths and capable of being made explicit through a sustained process of reflexive attention to inner experience.

Doctrinally, this account of the method of the *Meditations* not only foreshadows the reply to Burman, it represents no change whatever from the viewpoint of the early *Regulae*. In Rule 2 Descartes states that “there are two ways of arriving at a knowledge of things, through experience and through deduction (*per experientiam vel deductionem*)”:

[W]e must note that while our experiences of things are often deceptive (*experientias rerum saepe esse fallaces*), the deduction or pure inference (*deductionem vero, sive illationem puram*) of one thing from another can never be performed faultily by an intellect which is in the least degree rational, though it may be omitted if not seen [i.e., through “inadvertence,” as Descartes puts it a few lines later]. Furthermore, those chains with which dialecticians suppose they regulate human reason seem to me to be of little use here, though I do not deny that they are very useful for other purposes. In fact none of the errors to which men . . . are liable is ever due to faulty inference; they are due only to the fact that men take for granted certain poorly understood experiences (*experimenta quaedam parum intellecta supponantur*), or lay down rash and unfounded judgments. (1:12; AT 10:365)

Surprising is the air of sheer obviousness with which commentators are disposed to take “experience” to refer to empirical observation and “deduction” to logical derivation (cf., for example, Buchdahl 1969: 83). As far as “deduction” is concerned, the syllogistic inferences of the “dialecticians” are expressly excluded in the above passage; for such indirect logical inferences from merely probable premises fail to meet the condition stated in the earlier definition of deduction as “all that is necessarily inferred from other things known *with certainty*” (1:15; AT 10:369; emphasis added). The “deduction or pure inference of one thing from another” is another matter, however. This refers to immediate logical inferences of a very simple kind. Otherwise it would be difficult to see why they “can never be performed faultily by an intellect which is in the least degree rational,” since logical errors occur quite frequently, as do errors in mathematical reckoning, once we advance beyond simplest operations. However, in the *Regulae* immediate inference of one proposition from another is not yet sharply distinguished from the process of analytical reflexion. That is why Descartes goes on to suggest that error occurs not just through failure to notice the inferences to be drawn, but especially through choosing as starting points or premises “poorly understood experiences,” that is, those *not* clearly and distinctly perceived. The point is not just that such “experiences” are not certain, so that nothing inferred from them by logical means can be certain either; what makes them downright “deceptive” rather than just unreliable is the fact that men either (1) suppose *more* to be contained in them than just that which is immediately present to consciousness or (2) fail to *attend* carefully to all that is actually contained in them. In the former case, they embroider upon, in the latter they foreshorten what might be called “experiences perfectly understood.” If this is

correct, then the word “experiences” in the above passage refers to *inner* experiences of concepts and truths immediately present to consciousness, the starting points of knowledge, while “deduction” includes (along with logical reflexion) the fruits of analytical reflexion on those very innate ideas and axioms. The analytic method of discovery thus covers both *intuitus* and *deductio* in the sense in which these terms are used in the *Regulae*.

This account of the progress of the mind in analytic reflexion sheds an interesting light on Heidegger’s remark (1962: 57 and 80) that the measure of the influence of the *mathematical* ideal of knowledge on seventeenth-century thought is not so much its preoccupation with calculation and quantitative methods as its appreciation of the original Greek sense of *mathesis*: “Zur-Kenntnis-nehmen dessen, was wir schon haben” (“taking cognizance of what we already know”). As early as the *Regulae*, Descartes notes:

since it is not easy to review all the connections together [i.e., the whole series of interconnected truths], and moreover, since our task is not so much to retain them in our memory as to distinguish them with, as it were, the sharp edge of our minds (*acumen ingenij*), we must seek a means of developing our intelligence in such a way that we can notice them immediately whenever the need arises. In my experience, there is no better way of doing this than by accustoming ourselves to reflecting with some discernment (*cum sagacitate reflectere*) on the minute details (*ad minima*) of the things we have already perceived before (*quae jam ante percepimus*). (1:22ff.; AT 10:384)

No better way, in short, than reflexive attention (“reflecting with some discernment”) to “the minute details” of what we are pre-reflexively aware of (“have already perceived”). For this pre-reflexive consciousness Descartes also uses the term *perspicuitas* in the *Regulae*, so that *perspicuitas* and *sagacitas* correspond in the essentials to the later terms *conscientia* (or *cognitio interna*) and *reflectere* (in the sense of “reflexive attention”; cf. 3:335; AT 5:149). Although discernment or “sagacity in the methodical deduction of one thing from another” is juxtaposed to “perspicacity in the distinct intuition of particular things” (1:33; AT 10:400), the two are nevertheless continuous stages in a progressively unfolding process of intuition or intuitive induction. They “seem to coalesce into a single operation,” as Descartes remarks, “through a *single movement of thought*, as it were, which involves carefully intuiting one thing and passing on at once to the others” (1:38; AT 10:408; emphasis added). Whether they are called “insight” and “inference,” “consciousness” and “reflexion,” “perspicuity” and “sagacity,” or, as Descartes prefers to say in the *Regulae*, “intuition” and “deduction,” matters little. At issue is the correct understanding of Descartes’s method. The key point is that deduction cannot be equated with logical inference, being rather a matter of focusing one’s attention selectively on all that is contained implicitly within a single intuition, thus rendering explicit what is at first known only implicitly. That this is the method described in the section on the order of intuition above seems clear; it remains to be shown that it is identical with that *mathesis universalis* which Descartes first discovered through his work in pure mathematics, subsequently advocating its extension to applied mathematics before coming to a realization of its vital importance in metaphysics itself.

Universal Mathematics, Metaphysics, and Physics

In the *Regulae* Descartes notes that applied sciences like “astronomy, music, optics, mechanics, among others” have as much right to be called “mathematics” as the pure sciences of arithmetic, geometry, and algebra (1:19; AT 10:378). The abstract *mathesis universalis* that he goes on to describe is a more general science even than pure arithmetic and geometry (*mathesis vulgaris*), since it abstracts from the subject matters of all particular disciplines, confining itself to “questions of *order or measure*” (*ibid.*; emphasis added). By distinguishing the simple from the complex by reference to “some third term” (cf. 1:65; AT 10:451), to a “common *measure*” (*ibid.*; emphasis added), this “true mathematics” (1:19; AT 10:377) reduces the complex to the simpler and the simpler to the simplest, beginning every inquiry from the simplest and proceeding thence to the more complex in accordance with the correct *order*.

It is tempting to interpret “order and measure” so narrowly that the concept of a *mathesis universalis* is “restricted to the sphere of measurable magnitudes and relations of magnitude” (Mittelstraß 1978: 192). After all, Descartes describes his method as having been successfully applied only to pure mathematics thus far (Rule 2), and the whole point of the regress from pure to an even more universal mathematics is ostensibly to demonstrate the possibility (or rather the necessity) of extending the method to all those physical subjects that admit of mathematical treatment. Rule 12 illustrates how this might be accomplished in the case of color theory (1:40ff.; AT 10:413), while Rule 13 explains how “imperfect [physical] problems can all be reduced to perfect [mathematical] ones” using the example of sound (1:52; AT 10:431).

However, Descartes's predilection for using purely numerical ratios, ratios of extension, and other pure and applied mathematical examples provides only scant support for this restrictive interpretation. In Rule 4 he states unequivocally: “This discipline should contain the primary rudiments of human reason and extend to the discovery of truths in *any field whatever* (*ad veritates ex quovis subjecto eliciendas se extendere debet*)” (1:17; AT 10:374).⁷ And while the universal science of order and measure described more fully in the headings of Rules 5 and 6 is illustrated in the sequel by examples drawn predominantly (though not exclusively) from mathematics and physics, the wording of both Rules suggests that *order* is best understood very broadly in terms of the *relations of prior and posterior*, while *measure* is to be interpreted in the light of the general distinction between *the varieties of the simple and the complex* (or “absolute” and “relative,” as Descartes designates them, still more generally, in Rule 6). Thus, when Descartes writes in Rule 6 that “we should attend to what is most simple in each series of things . . . and should observe how all the rest are more, or less, or equally, removed from the simplest,” he understands “the simplest” as the “common measure” of the more complex, that is, he takes the simples as “common natures” (1:57; AT 10:440) and the common natures as common measures of the complex. If this is correct, then the talk of order and measure anticipates key features of the analytic method of discovery, and it is mistaken to assume that this method cannot be applied outside pure mathematics and mathematical physics to simple and complex propositions bearing on metaphysical subjects like God and the soul.⁸

Not only does any such restriction seem contrary to the plain sense of Rules 5 and 6, it runs counter to the quite parallel treatment of mathematical and metaphysical illustrations in Rule 12, where Descartes distinguishes between necessary and merely contingent “conjunctions” of simple natures, drawing his examples of the former from both mathematics and metaphysics:

. . . if I say that 4 and 3 make 7, the composition is a necessary one, for we do not have a distinct conception of the number 7 *unless in a confused sort of way we include 3 and 4 in it*. In the same way, whatever we demonstrate concerning figures or numbers necessarily links up with that of which it is affirmed. This necessity applies not just to things which are perceivable by the senses [i.e., *res corporeae*, including pure mathematical objects] but to others as well. If, for example, Socrates says that he doubts everything, it necessarily follows that he understands at least that he is doubting, and hence that he knows that something can be true or false, etc.; for there is a necessary connection between these facts and the nature of doubt. (1:46; AT 10:421, emphasis added; on Socrates cf. also 1:53; AT 10:433)

In this there is not the slightest indication that Descartes sees any difference whatever between the mathematical example considered first and that process of analytical reflexion upon one’s doubting by which Socrates discovers what truth is. This discovery belongs to *metaphysics*: “My understanding of what a thing [or substance] is, what truth [or certainty] is, and what thought is, seems to derive simply from [reflexion upon] my own nature” (2:26; AT 7:38) as a thinking thing that is certain of its own existence. That Descartes did not include “existence” (arguably the metaphysical idea *par excellence*) in this list of his innate ideas is surprising; but it is mentioned together with “thinking” in the reply to the first of the objections to the primitiveness of the *cogito* quoted earlier. As for the idea of God, a letter to Voetius employs it for purposes of illustration after first describing in general terms the manner in which implicit knowledge is rendered explicit by the process of analytical reflexion: “all those things whose knowledge is said to be naturally implanted in us are not for that reason expressly known by us; they are merely such that we come to know them [explicitly] *by the power of our own native intelligence, without sensory experience*” (3:222f.; AT 8B:167; emphasis added). On this follow examples, including the metaphysical idea of God:

All geometrical truths are of this sort – not just the most obvious ones, but all the others, however abstruse they may appear. Hence according to Plato, Socrates asks a slave boy about the elements of geometry and thereby makes the boy able to dig out certain truths from his own mind which he had not previously recognized were there, thus attempting to establish the doctrine of reminiscence. *Our knowledge of God is of this sort.*” (*Ibid.*; emphasis added)

From this it seems clear that all those (like Beyssade 1979: 237ff. and Röd 1971: 51f.) who stress the affinity between metaphysical and mathematical procedure are correct – without perhaps appreciating the full extent to which it is above all the process of analytical reflexion or intuitive induction that Descartes has in mind when he writes: “arithmetic and geometry . . . consist entirely in deducing conclusions by means of rational arguments (*in consequentiis rationabiliter deducendis*)” (1:12; AT 10:365).

So much for universal mathematics and metaphysics. As for physics, it is something of a commonplace that Descartes acknowledged a boundary between things knowable *a priori*, like the principles or foundations of the philosophy of nature, and the explanations of particular physical phenomena such as heat, light, sound, refraction, gravitation, magnetism, and the circulation of the blood. As interpreters eager to rescue Descartes from the shallow rationalist stereotype rightly insist, the latter sort of explanation can only be successfully achieved by recourse to experiment or observation (cf. Gewirtz 1941, and *ibid.*, n. 1 for references to the earliest French commentators to insist on this point; further, McRae 1961: 64ff.; Buchdahl 1969: 87, 96, 119ff., etc.; also Clarke 1981: ch. 4; and a host of others). Of course, Descartes's reason for insisting on the need for empirical investigation is characteristically metaphysical: "the supreme craftsman of the real world could have produced all that we see in several different ways" (*Principles* IV, 204; 1:289; AT 8A:327), all of them compatible with the immediately intuited structure of matter and the general mechanical principles known *a priori* to be necessarily true in any world that we are capable of conceiving; observation is thus required to determine which world God chose. But if certainly not all, it is relatively less clear just *how much* of the science of nature Descartes actually thought capable of presentation in something resembling a formal, axiomatizable system.

It seems reasonable to suppose that the situation as regards pure and empirical physics parallels that of necessary and contingent truth. Descartes retains this distinction, though the line of demarcation runs rather differently than we would draw it today. For it includes within the realm of the necessary all the basic concepts and most universal laws of physics. That is why the method of *ordo et mensura* is applicable to portions of the applied mathematical sciences (e.g., astronomy, music, optics, etc.) which we today regard as requiring a different sort of treatment. True, Descartes regarded these sciences as unable to progress very far without recourse to suppositions or subsidiary hypotheses about which no more than moral certainty is attainable; but beyond the most general principles common to them all, he certainly regarded the first principles proper to each science as amenable to discovery by an *a priori* method. If the parallel with necessary and contingent truth holds, it is certain that much (though uncertain *how much*) that would nowadays be regarded as "hypothetical" was regarded by Descartes as knowable *a priori* through the analytic method of discovering necessary truth.

Given that Descartes is so sanguine about what thus falls unproblematically within the scope of his purely formal "deductive" science, it will be difficult to confine *mathesis universalis* to "a general theory of quantities and proportions" (Mittelstraß 1979: 597), excluding from the sphere of rigorous *mathesis universalis* everything apart from what Descartes describes as "the principles of my physics" (3:157; AT 3:233; cf. also 2:397; AT 7:602). It will likewise be hard to maintain a sharp distinction between *mathesis universalis* and *scientia* or *sapientia universalis*, that is, between a "unified science" and a universal scientific method (Mittelstraß 1978: 177f.; cf. McRae 1961: 62). The safest conclusion is that, when applied to Descartes, the talk of a "logical unity of science" (*ibid.*: 179) is ambiguous between (1) a thoroughgoing logical interconnection of all particular sciences and (2) a "methodological unity," a single "Organon" or method for all the sciences (*ibid.*). Descartes would appear to mean both these things by *scientia*, *sapientia*, or (synonymously) *mathesis universalis*. He has in mind a method whose field

of application is coextensive with the sphere – however imprecisely defined – of pure reason itself.⁹

Conclusion

The method described here obviously has a direct bearing on the question of whether or not Descartes can be legitimately called a rationalist. By general agreement, the answer turns on the extent to which he subscribed to (1) a fairly robust doctrine of innateness along with (2) a model of the logical structure of science patterned after that of formal, axiomatizable systems. If the view of the matter taken here is correct, Descartes's commitment to (1) is indisputable. As for (2), the mathematical sciences indeed furnished Descartes with a universal model of scientific knowledge, for they exemplify in an outstanding way that analytic method of discovery, the full range of which Descartes only discovered gradually, when he applied it first in the special sciences and then in metaphysics itself. If *deductio* is understood as Descartes in fact explains it in the *Regulae*, not as logical deduction, but as the process of the mind described above as analytic reflexion, reflexive analysis, and intuitive induction, we may indeed say that the method of the mathematical sciences is deductive as well as paradigmatic for the *a priori* sciences (or the *a priori* portions of the sciences) in general. But this is not what is usually meant by those who see in Descartes yet another rationalist philosopher strangely in thrall to the geometrical method. Even where the difference between the analytic and synthetic methods does not go unnoticed, the two are seldom sharply distinguished. Only in the light of such a distinction can one begin to understand the rules of method set out in Part Two of the *Discourse*.

Acknowledgments

My thanks to the University of Toronto Press for permission to reproduce here material from my book *Insight and Inference: Descartes's Founding Principle and Modern Philosophy* (1999). That work should be consulted for a full, scholarly treatment of Cartesian method, including discussion of the relevant literature in English, French, and German.

Notes

- 1 Cf. Williams (1962: 91): "Does this passage contradict the one I quoted before? Burman thought that it did." On the other hand, McRae (1972: 39): "Burman asks whether this [passage from the Second Replies] is consistent with what Descartes says in *Principles*, I, 10. Plainly it does seem contrary."
- 2 This manner of reconciling the passages in which Descartes speaks of the knowledge of universal principles, now as prior to that of particular instances, now as posterior, seems preferable to Wilson's suggestion that Descartes "simply could not make up his mind" (Wilson 1978: 57).

- 3 Markie (1992: 170) simply discounts this distinction, remarking of the passage from the conversation with Burman: "The difference between explicit and implicit knowledge escapes me."
- 4 Cf. the indignant reply to Bourdin, the author of the Seventh Objections: "[H]is apparent intention is to persuade people that I do not approve of syllogistic patterns of argument, and hence that my method is not a rational one. But this is false, as is clear enough from my writings, where I have always been prepared to use syllogisms when the occasion required it" (2:355; AT 7:522).
- 5 Kemp Smith (1952: 57f.) is characteristically acute on this point. By way of illustration, he employs Descartes's principle "things that are the same as a third thing are the same as each other [symbolically: If $A = B$ and $B = C$, then $A = C$]" (1:45; AT 10:419) as the major of the following syllogism: All things equal to the same thing are equal to one another; A and C are things equal to the same thing, B ; hence A and C are equal to one another. Descartes allows, Kemp Smith observes, that this syllogism states the conditions on which the truth of the conclusion rests. But what he wishes to emphasize is that "in taking this roundabout path it is all too apt to *conceal from view the path by which alone the conclusion can have been reached*" (emphasis added). This captures the source of Descartes's dissatisfaction with the syllogism exactly. But is the path thus concealed the very path or progress of the mind described in the *Conversation with Burman*? Everything in Kemp Smith's analysis suggests that it is. Expressed in the minor premise of the syllogism, he writes, is "the material condition . . . that A and C are both equal to the same third thing, B ." This "is the whole of the inference": to know this minor, i.e., to intuit the simple natures for which A , B , and C stand and the relations among them, is indeed "to know the whole matter." Yet *how* the minor is known is not only not explained, but actually obscured, by the syllogistic form. That is precisely Descartes's complaint. As for "the formal condition expressed in the major premiss," concrete particular truths do not require to be deduced from abstract universal ones since they possess "the same intrinsic underived validity" (*ibid.*). It is one and the same process of intuition by which we both know particular truths and "apprehend the corresponding universals" (*ibid.*). Thus, that "two plus two and three plus one are both equal to four, and therefore to one another, are truths as certain as the axiom that things equal to the same thing are equal to one another; and as [Descartes] further contends, we must intuitively apprehend the particular truths if we are to be in a position to discern and approve the wider, general truth" (*ibid.*). The parallels with the *Conversation with Burman* are unmistakable. See also Curley's treatment of the same example (1978: 29ff.).
- 6 Cf. Edgley (1970: 14) on "the temptation to suppose that everything implied by what someone knows to be true he must also know to be true." Also Curley (1978: 28): "the principle 'If p entails q , then (a knows that p) entails (a knows that q)' is a very tempting one in cases where the inference from p to q is obvious."
- 7 In a letter to Mersenne of February 27, 1637 regarding the *Discourse* and the attached essays, Descartes states: "I have inserted a certain amount of metaphysics, physics and medicine in the opening *Discourse* in order to show that my method extends to topics of all kinds" (3:53; AT 1:349), even to metaphysics. This is at least implied at 1:12f.; AT 6:21 of the *Discourse* as well.
- 8 McRae (1961: 62f.) suggests that *mathesis universalis* should be regarded as "the science of 'order and measurement,' while the still more universal method common to all sciences is the science of 'order'." However, it is difficult to see how there can be any order without some measure in the transferred sense of a standard (whether an ideal or a unit) in relation to which the items are ordered or "priorized." On the proper and transferred sense of *mensura*, see Mahoney's (1982: 169) paraphrase of a passage from St. Thomas's early *Scriptum super libros Sententiarum* (ca. 1256): "A measure (*mensura*) in the proper sense of the word is that

by which the quantity of a thing (*quantitas rei*) becomes known. In the genus of quantity it is the minimum of the genus – namely, the unit – which provides the measure. However, the term ‘measure’ (*mensura*) has been transferred (*transumptum*) to all genera, so that what is first, simplest, and most perfect in each genus is said to be the measure of everything else in that genus.” A similar distinction is then traced through a variety of other medieval and Renaissance thinkers.

- 9 On the question whether *mathesis universalis* is strictly universal or restricted to the mathematical and mathematizable sciences, see also the definition of “method” in Rule 4: “By ‘a method’ I mean reliable rules which are easy to apply and such that if one follows them exactly, one will never take what is false to be true or fruitlessly expend one’s mental efforts [on that which is beyond one’s ken], but will gradually and constantly increase one’s knowledge (*scientia*) till one arrives at a true understanding of everything within one’s capacity (*omnium quorum erit capax*)” (1:16; AT 10:371f.). On the strength of this, Vollrath (1962: 280, 282) describes Descartes’ *mathesis universalis* – somewhat misleadingly – as a *cognitio omnium*.

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Chapter 10

Descartes's Use of Doubt

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In Part Two of the *Discourse on the Method* we find a remarkable resolution:

regarding the opinions to which I had hitherto given credence, I thought that I could not do better than to undertake to get rid of them, all at one go, in order to replace them afterwards with better ones, or with the same ones once I had squared them with the standards of reason. (1:117; AT 6:14)

Two questions arise. What are these “opinions” to which Descartes had hitherto given credence? And what are the “standards of reason” by which they should be judged?

Early on in the First Meditation, Descartes tells us that his opinions come “either from the senses or through the senses” (2:12; AT 7:18). Those that come *from* the senses Descartes calls the “teachings of nature.” For example, nature teaches that there are objects in the world around me resembling the ideas I receive from the senses in respect of shape and color, etc. (2:26; AT 7:38). Those opinions that come *through* the senses are the opinions of others, heard and then preserved in memory (1: 218–20; AT 6:35–8). From childhood Descartes absorbed the teachings of both nature and society and far into adulthood he holds these opinions to be “most true” (2:12; AT 7:18). So Descartes’s “opinions” comprise almost all of the beliefs he finds himself with at the outset of his inquiry.

Descartes is dissatisfied with these opinions. For example, he remarks that

When I say “Nature taught me to think this,” all I mean is that a spontaneous impulse leads me to believe it, not that its truth has been revealed to me by some natural light. (2:26–7; AT 7:39)

Clearly, he thinks there is a higher standard to which he should conform and he states it in the First Meditation:

Reason now leads me to think that I should hold back my assent from opinions which are not completely certain and indubitable just as carefully as I do from those which are patently false. So, for the purpose of rejecting all my opinions, it will be enough if I find in each of them at least some reason for doubt. (2:12; AT 7:18)

It looks as if Descartes means to abandon almost all of his beliefs until he can find reasons for holding them which render those beliefs "certain and indubitable."

There has been much debate over how to interpret these statements. It has been maintained that Cartesian certainty is an ideal which believers should aspire to rather than a standard which every reasonable belief must meet. And indeed, towards the end of the First Meditation, Descartes allows that the beliefs he is setting out to undermine are "highly probable opinions – opinions which, despite the fact that they are in some sense doubtful . . . it is still much more reasonable to believe than to deny" (2:15; AT 7:22). This statement is important because it shows that the Cartesian skeptic allows that we have substantial, if inconclusive evidence for our various opinions. But Descartes does not here say that belief in *p* is reasonable provided the evidence makes *p* highly probable (*pace* Broughton 2002: 46, 87–8; see also MacArthur 2003: 169); he merely says that if the evidence makes *p* highly probable then belief in *p* is more reasonable than belief in not-*p*, a point which interests him because he is about to consider whether to adopt the supposition that his opinions are actually false. For all the quoted passage tells us, in the absence of certainty agnosticism may be the only option that is reasonable *tout court*. As we shall see, when Descartes considers this very point in the Fourth Meditation, that is exactly what he says (see also 2:53; AT 7:77).

It has also been maintained that the standard of certainty is meant to apply to belief only in a certain special context, in the context of scientific inquiry or in the course of our search for knowledge. (See Frankfurt 1970: ch. 2; Wolterstorff 1996: 180–218. Compare Broughton 2002: 7–18, 42–61; Burnyeat 1997: 118–20; Wilson 1978: 42–9). This reading gains support from Descartes's repeated insistence that his Method of Doubt has no application to practical affairs:

As far as the conduct of life is concerned, I am very far from thinking that we should assent only to what is clearly perceived. On the contrary, I do not think that we should always wait even for probable truths; from time to time we will have to choose one of many alternatives about which we have no knowledge. (2:106; AT 7:149; see also 2:15; AT 7:23; and 2:172; AT 7:248; and 2:243; AT 7:351)

Some interpreters conclude, with Frankfurt, that the doubts of the First Meditation are "purely methodological" or that the rule of certainty is not intended by Descartes as "an ordinary rule for conscientious believing" (Broughton 2002: 46).

In this chapter, I shall argue that Descartes acknowledges the existence of a number of representational states governed by rather different normative standards. Belief or judgment is only one of these states, a state governed in all contexts by the rule of certainty. It is against our beliefs or judgments that the skeptical reflections of the First Meditation are directed. But when it comes to practical affairs, it is often appropriate to invoke another sort of representational state in the process of deciding what to do. These states – conjectures – are not governed by the rule of certainty and are thus immune to the skeptical reflections of the First Meditation.

Many commentators suppose that the whole of Descartes's skeptical argumentation in the First Meditation turns on the radical hypothesis that we are always dreaming or on the idea of an all-powerful deceiver. But if, as I maintain, it is the simple demand for certainty which drives Descartes's skepticism, these hypotheses must play a rather

more specialized role. Reviewing the argument of the First Meditation in the Sixth, Descartes remembers that while trusting the senses “I had many experiences which gradually undermined all the faith I had had in the senses” (2:53; AT 7:77), and he quotes examples of towers which looked round at a distance but square from close up, and so forth. Only then does he mention that “to these reasons for doubting I recently added two very general ones” viz. the dreaming and the evil demon argument. Elsewhere I have argued that the latter are introduced for a very specific purpose, to directly undermine our general belief that there are objects distributed in a space around us. And they do this in just the way that ordinary sensory error undermines our convictions about what is now before us, by depriving us of certainty on the point (Owens 2000: 119–24).

This chapter has two parts. In the first two sections I give Descartes’s reason for thinking that belief labors under the stringent epistemic requirement enunciated in the First Meditation. Descartes must tell us why a failure to satisfy the demand for certainty could move a reasonable person to abandon belief and, I shall argue, the Fourth Meditation contains a persuasive answer to this question. In the last two sections, I shall show that, for Descartes, there are ways of representing the world to which this answer does not apply and so which are not subject to the demand for certainty.

The Role of Reflection

Having dissolved most of our convictions in the First Meditation, in the Second and Third Meditations Descartes draws our attention to beliefs which, it seems, can’t be undermined in the same way, to beliefs which are certain. By the time we get to the Fourth Meditation, Descartes is ready to step back and give an account of how our faculty of judgment works: with the experience of epistemic failure followed by some epistemic success behind us, we are now in a position to describe the mechanism which underlies all this. The Fourth Meditation is the obvious place to look for Descartes’s account of why reasonable belief requires certainty.

Here is what we find. Descartes starts by considering a case in which

[A] my intellect has not yet come upon any persuasive reason in favour of one alternative rather than the other. This obviously implies that I am indifferent as to whether I should assert or deny either alternative, or indeed refrain from making any judgment on the matter. (2:41; AT 7:59)

Descartes immediately takes things further:

[B] What is more, this indifference does not merely apply to cases where the intellect is wholly ignorant, but extends in general to every case where the intellect does not have sufficiently clear knowledge at the time when the will deliberates. For although probable conjectures may pull me in one direction, the mere knowledge that they are simply conjectures, and not certain and indubitable reasons, is itself quite enough to push my assent the other way. (*Ibid.*)

From this Descartes at once draws the following conclusion:

[C] If, however, I simply refrain from making a judgment in cases where I do not perceive the truth with sufficient clarity and distinctness, then it is clear that I am behaving correctly and avoiding error. But if in such cases I either affirm or deny, then I am not using my free will correctly. (*Ibid.*)

Without “certain and indubitable reasons” we lack “sufficient clarity and distinctness.” In this section, I’ll offer a reading of the above passages, postponing objections until the next.

In Passage [A], Descartes says that if the evidence in favour of *p* is no greater than that in favor of not-*p*, this “obviously implies that I am indifferent” as to whether *p*. Is that really so? Wishful thinkers and careless believers are often heedless of the evidence. Why shouldn’t “I” be one of them? Here Descartes is drawing our attention to the following fact: someone who judges that the evidence in favor of *p* is no stronger than that against it (“my intellect had not yet come across any persuasive reason”) cannot get himself to believe that *p* by judging that he *should* believe that *p* given this evidence (“I am indifferent as to whether I should assert or deny either alternative”); reflection on such evidence will leave him feeling indifferent between the two propositions. This person is in the same situation as someone asked to form a view about whether the number of stars is odd or even; he might find himself with an ungrounded belief on this matter, but he couldn’t arrive at it by reflecting on what he thought of as *reasons* for belief.

Here Descartes is not setting up his own epistemic standards, rather he is getting his standard from a fact about belief, namely that when human beings reflect on which of two equally well supported but incompatible propositions they ought to believe, that process of reflection generates no inclination to believe either. Where there are motivational forces at work apart from reflection, a view may still be formed but, so far as reflection on what strikes him as a good reason goes, the believer will be left agnostic on the matter. What should convince us of this is each person’s “experience in his own case”; though “self-evident” these facts about our motivational psychology cannot be proved “by rational argument” (2:259; AT 7:377).

We are still a long way short of any demand for certainty, but Passage [A] does tell us something about the workings of Cartesian skepticism. Descartes sets out to undermine our beliefs by demonstrating that, as presently constituted, they fail to live up to a requirement which we ourselves acknowledge. And if the demand for certainty is to be the motor of an effective skepticism, it is essential that Descartes proceed in this fashion. Should he appeal to some standard of justification to which ordinary believers are not in some sense already committed, their doubts are more likely to focus on Descartes’s standard than on the beliefs he disparages.

Let’s examine the rest of the quotation. Passage [B] suggests a much stronger requirement on reasonable belief: that belief in *p* must be supported by “certain and indubitable reasons” i.e. *conclusive* evidence for *p*. Again this claim is supported with an assertion about what happens when we *reflect* on our grounds: “although probable conjectures may pull me in one direction, the mere knowledge that they are simply conjectures, and not certain and indubitable reasons, is itself quite enough to push my

assent the other way.” This confirms our earlier hypothesis that Descartes is testing the adequacy of certain reasons by asking whether reflection on them can motivate belief. He now suggests that reflection on merely probable grounds cannot do the trick. On this reading, it comes as no surprise when, in Passage [C], Descartes moves from these points to the conclusion that certainty is, in fact, the correct normative standard for belief.

One might well wonder about the plausibility of the claims Descartes makes about reflective indifference. Do I really feel indifferent about whether to believe *p* or not-*p* when the evidence strongly (though not conclusively) favors *p*? Don’t I often form the belief that *p* in these circumstances because I think I have sufficient evidence for *p*? I shall tackle this worry in the next section, but first I want to connect the above passages from the Fourth Meditation with the doubts of the First.

The “I” of the above passages is an engaged epistemic deliberator trying to work out what he should believe about a certain matter on the basis of the evidence before him; he is not evaluating beliefs which have already been formed. Yet in the First Meditation Descartes does appear to be subjecting beliefs which he has already to an unfavorable evaluation. For Descartes, these tasks are connected: the way to evaluate a belief in *p* which is based on evidence *e* is to ask yourself whether you could have formed a belief in *p* simply by reflecting on the probative force of evidence *e*. That is the test the meditator applies so destructively in the First Meditation. Descartes demands that the conclusions of the epistemic evaluator be grounded in the more fundamental perspective of the epistemic deliberator and his attempt to live up to this demand leads to skepticism.

In the Seventh Replies, responding to Pierre Bourdin, Descartes sums up his procedure in the First Meditation with a homely analogy:

Suppose [Bourdin] had a basket full of apples and, being worried that some of the apples were rotten, wanted to take out the rotten ones to prevent the rot spreading. How would he proceed? Would he not begin by tipping the whole lot out of the basket? And would not the next step be to cast his eye over each apple in turn and pick up, and put back in the basket only those he saw to be sound, leaving the others? (2:324; AT 7:481)

Frankfurt (1970: 19–20) takes this passage to be confirmation of his view that Descartes’s “rejection” of all his beliefs is purely methodological and so need not be based on any prior examination of the grounds for them: it is little more than the decision to undertake such an examination. But there is a two-stage process here of which tipping the apples out is only the first.

In the First Meditation, Descartes initially asks us to evaluate our current beliefs from the perspective of someone who is trying to decide whether or not to form them. This procedure does indeed involve the sort of methodological distancing which Frankfurt equates with the Doubt. Having got us to adopt this perspective, Descartes reminds us of various sources of error which are usually ignored when such beliefs are formed and asks whether we can explicitly discount them from our new perspective. The answer is that in good conscience we cannot and so, as epistemic deliberators, we find ourselves unable to endorse our own beliefs. It is at *this* stage, only a little further on in the First Meditation, that Descartes invites us to abandon these beliefs.

But why adopt this rather roundabout procedure? Why proceed via the standpoint of the epistemic deliberator? Why not just appeal directly to our intuitions about what one is and is not entitled to believe? To put the question another way: why does the First Meditation take the form of a meditation? Why insist that its skeptical argumentation must be stated in the first person? When Descartes addresses these questions (2:110–13; AT 7:155–60) he insists that the meditation form is indispensable, but he is less clear about the reason for its indispensability. I shall side with Foucault (1998: 405–6) and against, for example, Wilson (1978: 4–5) in maintaining that Descartes's use of the first person is essential to the *cogency* of the skeptical argumentation in the First Meditation.

The Need for Certainty

Imagine you are expounding the First Meditation in Epistemology 101. In an attempt to get your students to take Descartes seriously, you say: "Here is this man standing before this barn. He doesn't bother to go around the back of the barn to establish that it is not a mere facade. He concludes simply from the look of it that it is indeed a barn. Isn't he being unreasonable in ignoring the possibility that what's before him is a mere facade?" That way of putting the point won't do the trick. The students will respond that, by the standard usually applied to such situations, the man would be unreasonable *not* to ignore this possibility (unless he has grounds for thinking he is on a film set, etc., etc.). And Descartes has yet to show why the standard we normally apply is, in fact, inappropriate.

To rescue the lecture, first let's try to say *why* the laxer standard seems appropriate. Some might maintain that there is nothing to add here: it is just a fact that our epistemic norms don't require that check. I agree that explanation must end somewhere, but need it come to a halt quite so quickly? Isn't there a story to be told about why we don't demand that our subject check that every barn he sees has a back before concluding it is a barn? Human beings need beliefs, they need to have convictions about a whole range of matters – to satisfy their curiosity, to ground their emotional lives as well as for more practical purposes. That's why it would be unreasonable to demand the elimination of every possible source of error. Asked to defend our conclusion that the subject's conviction was reasonable, we would note that someone with a finite capacity to collect, store, retrieve, and evaluate evidence can't always be holding out for more: at some stage, he must form a view on the basis of the evidence he has now got if he is ever to form a view at all.

Given this, how do we present the skeptic's point in a way that might carry conviction? Do as Descartes suggests and get the students to look at things from the standpoint of an epistemic deliberator. Suppose you start with no view about whether there is a barn before you and then try to get yourself to form a view by reflecting just on what you see from the spot on which you are standing. Try telling yourself the very story you told a moment ago, all that stuff about the constraints you labor under and your need to make up your mind. It doesn't seem to have the required impact; it doesn't seem to be the sort of thing which could (just insofar as you are rational) convince you to form a view about whether there is a barn before you.

We are now in a position to support the claims Descartes makes about indifference. First, it is true that I feel reflective indifference in the face of inconclusive evidence, at least once I am clear that I would need to invoke pragmatic considerations to make up my mind. However much the inconclusive evidence is stacked in favor of *p* and against not-*p*, I could always wait for more, and purely evidential considerations will never explain why I don't wait for more. To motivate belief, to explain why we make up our minds, we need to invoke pragmatic considerations, but *reflection* on such considerations does not make one's mind up: in that sense, it leaves one feeling indifferent, just as Descartes says. Our minds may be made up because of these pragmatic constraints, but *reflection* on these considerations won't move us.

Descartes puts his skeptical argumentation in the form of a meditation precisely to bring this fact home to us; the inefficacy of reflection on pragmatic considerations is evident once we are persuaded to adopt the essentially first person standpoint of the epistemic deliberator. That's why Descartes is so insistent that the reader must "join me in meditating" (2:112; AT 7:158) if he is to rid himself of the prejudices and preconceptions which he brings to the *Meditations*. We'd miss his point if we simply evaluated beliefs we had already formed from the outside, as it were.

Does the above line of reasoning make an appearance in Descartes's text or is it something we must attribute to him to make sense of what he does say? Before answering, let me first rephrase the points just made. In the eyes of an "external" evaluator there are two distinct questions one can ask about a prospective belief: (a) should the believer form a view about whether *p*; (b) given that he should form a view, should he believe that *p* or that not-*p*? But from the first person standpoint of the epistemic deliberator, this distinction evaporates. For the prospective believer themselves, there are not two separate questions: should I now form a view about whether *p*? If so, which view should I form? Insofar as reflection on certain considerations persuades him that he ought to form a view on whether *p* is true, such reflection can do so only by persuading him of the truth (or falsity) of *p*. In getting us to meditate, Descartes makes this fact plain.

This line of thought comes close to the surface of Descartes's text a little earlier on in the Fourth Meditation where he gives his theory of error:

When I look more closely at myself and inquire into the nature of my errors . . . I notice that they depend on two concurrent causes, namely on the faculty of knowledge which is in me, and on the faculty of choice or freedom of the will; that is they depend on both the intellect and the will simultaneously. Now all that the intellect does is to enable me to perceive the ideas which are subjects for possible judgments; and when regarded strictly in this light, it turns out to contain no error in the proper sense of that term. (2:39; AT 7:56)

To get error, I must endorse or assent to the ideas served up by the intellect when those ideas are, to some degree, obscure or confused and assent is an act of will.

Coming to believe *p* involves settling on *p* (rather than not-*p*) as the better option and settling on now (rather than later) as the time to make up your mind about whether *p* is true. Following Descartes, we might call the faculty which tackles the former issue "the intellect" and the faculty which resolves the latter issue "the will".

Now suppose *pace* Descartes that reasonable belief could be based on a sufficiency of inconclusive evidence. Then there would always be two questions to address. First, what is the data served up by the intellect? Does it make *p* look more or less plausible than not-*p*? Evidence alone seems relevant here. Second, is the data served up by the intellect sufficiently convincing and the issue sufficiently pressing to make it reasonable for us to form a view on the matter right now?

The fact that Descartes gives the will a role to play in the process of belief formation might make it look as if he thought that the formation of a belief requires us to attend firstly to the clarity of the ideas served up by the intellect and secondly to those other considerations which determine whether it would be sensible to make a decision now, to assent to the proposition which the intellect presents to us. But while Descartes allows that there are indeed two independent sources of epistemic *motivation* here, this does not mean he thinks there are two different kinds of *reason*. When it comes to judgment (rather than conjecture), the will has no reasons for assent except those derived from the intellect:

the scope of the will is wider than that of the intellect; but instead of restricting it within the same limits, I extend its use to matters which I do not understand. Since the will is indifferent in such cases, it easily turns aside from what is true and good, and this is the source of my error and sin. (2:40–1; AT 7:58)

The *only* reasons for belief are served up by the intellect or, to put the point in Descartes's words, "it is clear by the natural light that the perception of the intellect should always precede the determination of the will" (2:41; AT 7:60).

Given this, if the intellect gave us only probable evidence we would never be entitled to form beliefs. Possessing merely probable evidence and reflecting on what he ought to believe, the believer could answer the question as to *how much* probable evidence is sufficient to justify belief only by going beyond the deliverances of the intellect, only by employing his will in a way that seems illicit not only to Descartes but also to the believer himself. As we have seen, a rational believer cannot control his beliefs by making judgments about what he should believe given the non-evidential constraints on his mental life.

The only way for the believer to retain reflective control over his mental life is to insist on certainty; mere probability, however great, will never do for belief. Practical affairs might require us to make assumptions about how things are, assumptions whose truth the understanding does not assure us of; here the will must go beyond the deliverances of the intellect. But to allow our will to play an independent role in determining our judgments is to enter a region in which it seems *to ourselves* that we have nothing to go on in the way of reasons for belief, though we may still find ourselves with (irrational) convictions. In that sense, our will is *indifferent* whenever the intellect is uncertain.¹

We have arrived at the conclusion that certainty is required for justified belief. Isn't this rather alarming? Is it ever possible to meet this standard? I don't find a clear answer in Descartes. In some moods he appears to think that one can and should confine one's beliefs to matters about which one can be absolutely certain. The Sixth Meditation contains an attempt to show how careful checks can enable us to avoid

making erroneous judgments based on the deliverances of the senses. For example, speaking of the judgments we make about the shape and size of particular objects, he remarks that:

Despite the high degree of doubt and uncertainty involved here, the very fact that God is not a deceiver, and the consequent impossibility of there being any falsity in my opinions which cannot be corrected by some other faculty supplied by God, offers me a sure hope that I can attain the truth even in these matters. (2:55–6; AT 7:80)

On the other hand, Descartes was pessimistic about the capacity of human beings to take his advice and he ends the *Meditations* with the following words:

since the pressure of things to be done does not always allow us to stop and make such a meticulous check, it must be admitted that in this human life we are often liable to make mistakes about particular things and we must acknowledge the weakness of our nature. (2:62; AT 7:90; see also 1:289–91; AT 8A:389–91)

We don't make time to check the back of that barn even though true justification requires "certain and indubitable reasons."

It is now clear why Descartes thinks that certainty is required for justified belief. But we are not yet out of the woods. Why doesn't the demand for certainty apply with equal force in the practical sphere?

Descartes's Conjectures

The (temporary) success of Descartes's skeptical argumentation leaves him facing the question: how is one to act without belief? Now one could refuse to answer this question. One could maintain that once theoretical reason has been undermined, there is no point in looking for *reasons* for acting one way rather than another. Instinct may ensure that one behaves in a certain fashion, but practical reasoning is at an end. This is not Descartes's view. Such an abdication of responsibility for one's mental life would be anathema to Descartes, who places self-control at the center of his ethical theory (e.g., 1:384; AT 9:446). The temporary demise of theoretical reason leaves practical reason intact and Descartes uses the latter to govern his life as a skeptic. For example, he pursues knowledge, a pursuit which involves him making the judgment that knowledge is good and having views about how best to attain it (1:124–5; AT 6:28). Descartes's skeptical inquiry is meant to be an activity fully under his control because consciously directed at an aim which is judged to be both worthwhile and attainable.

How will Descartes behave in other matters until he recovers his earlier knowledge? Having resolved to rid himself of his opinions in Part Two of the *Discourse*, Descartes begins Part Three by sketching a "provisional moral code" to guide him "lest I should remain indecisive in my actions while reason obliged me to be so in my judgments" (1:122; AT 6:23). In content, Descartes's provisional moral code resembles that which guided the Pyrrhonian skeptics who wished to "live by appearances." But unlike

Descartes, the Pyrrhonians abjured practical reasoning: they *were* guided by instinct (Sextus Empiricus 1994, 1: 23–30).

Descartes sets himself to

obey the laws and customs of my country . . . and governing myself in all other matters according to the most moderate and least extreme opinions – the opinions commonly accepted in practice by the most sensible of those with whom I should have to live. (*Ibid.*)

Here Descartes is not passively acceding to the dictates of common sense and the weight of public opinion. Rather, he is actively choosing to adopt certain opinions because he judges them appropriate. But if these opinions are not beliefs, what are they?

We can discover what sort of state we are dealing with here by looking at the reasons Descartes gives for adopting “the most moderate and least extreme opinions.” First, there is “probability”:

since in everyday life we must often act without delay, it is a most certain truth that when it is not in our power to discern the truest opinions, we must follow the most probable. Even when no opinions appear more probable than any others, we must still adopt some. (1:123; AT 6:25)

It would be quite wrong to conclude from the First Meditation that any opinion is as probable (or improbable) as any other. As we have seen, Descartes clearly states that his “habitual opinions” remain “highly probable” (2:15; AT 7:22), something he could know only via the intellect. (On this point, as on the role of practical reason, Cartesian skepticism may be closer to Academic than to Pyrrhonian skepticism: Sextus Empiricus 1994, 1: 226–31.) The only serious candidates for retention are opinions which appear at least as probable as their competitors, so we are “aiming at truth” when we adopt these opinions. But such opinions are unlike Cartesian judgments in that evidence isn’t the only consideration relevant to their adoption: here the will has reasons of its own.

Descartes says that having abandoned his earlier opinions,

I was sure I could do no better than follow those of the most sensible men. And although there may be men as sensible among the Persians or Chinese as among ourselves, I thought it would be most useful for me to be guided by those with whom I should have to live. (1:122; AT 6:23)

Now I take it that no one who forms opinions which appear improbable to Descartes will count as reasonable in his eyes. Still, a variety of opinions pass this test and Descartes proposes to adopt the opinions of those “with whom I should have to live.” Clearly, there are good pragmatic reasons for this policy: social coordination is effected and social harmony enhanced if we all act on the basis of shared assumptions about the world. When Descartes adds that “in order to discover what opinions they really held, I had to attend to what they did rather than what they said,” he clearly has such considerations in mind.

Descartes goes on:

Where many opinions were equally well accepted, I chose only the most moderate, both because these are always the easiest to act upon and probably the best (excess usually being bad) and also so that if I made a mistake, I should depart less from the right path than I would if I chose one extreme when I ought to have pursued the other. (1:122–3; AT 6:24)

Here Descartes notes further relevant pragmatic considerations: he should adopt opinions which he can act on easily and without incurring great risks if they turn out to be wrong.

So what kind of beast are these opinions which Descartes recommends as a substitute for belief? They are “conjectures” (2:41; AT 7:59) or guesses. Reasonable guesses are based on evidence. True, we can make a guess even when we have no evidence, but we can’t reasonably guess that *p* regardless of whatever evidence we do have. In that sense guesses “aim at the truth.” On the other hand, we don’t guess just with the aim of getting it right. We’ll make a guess when we expect to benefit from making that guess and so the need for social coordination, avoidance of risk, etc. will help to determine which guess we make (Owens 2003: 289–93).

Furthermore, there is no problem with controlling our guesses by reflecting on both the evidential and the pragmatic considerations which together make these guesses reasonable. Take one of Descartes’s own examples. I am hungry, indeed starving, and the only food available is apples. It occurs to me that these apples may be poisoned, though there is no sign of this. Here I tell myself that to preserve life, I must take a view and assume they are not. I can get myself to do this by reflecting on these practical necessities and on the difficulty of obtaining a cast iron guarantee that the apples are safe. And because reflection on the probative force of these considerations does *not* (insofar as I am reasonable) leave me in a state of indifference as to what I ought to do, these considerations justify my guessing that the apples are safe and then eating them. Indeed, Descartes goes so far as to say that I would be “insane” not to eat the apples (3:189; AT 3:423).

We might conclude, using language Descartes employs elsewhere (1:130; AT 7:38 and 1:289–90; AT 8A:328), that I am entitled to a “moral certainty” that the apples are not poisonous. But matters are different when the question is whether I ought to believe that the apples are safe. Belief requires “metaphysical certainty” (Curley 1993: 14–20). Yet most of us do not just guess that the fruit we eat is safe, we believe this and we believe this even though we acknowledge that evidence might come along which showed the fruit we eat to be unsafe. Are such beliefs reasonable? Can we get ourselves to believe that the apples are safe by reflecting that we have enough evidence to believe this, given that we can’t spend our whole lives investigating the matter and so forth? Such reflections don’t have the same power to convince us of the truth of this proposition as they do to get us to act on the assumption that it is true and so (for Descartes) these considerations cannot constitute reasons for belief. One who believes that the apples are not poisonous does so because they feel an urge to believe this, not because it seems to them that they are entitled to this belief (2:259; AT 7:377).

It is now clear that the line of thought which prevented us taking inconclusive evidence as sufficient reason for belief does not apply to those conjectures we make for practical purposes. But what are the principles of reasoning we employ when formulating and revising our conjectures? And what is their status? Descartes hints at the sort of thing he has in mind when stating the second maxim of his provisional moral code:

to be as firm and decisive in my action as I could, and to follow even the most doubtful opinions, once I had adopted them, with no less constancy than if they had been quite certain. In this respect I would be imitating a traveler who, upon finding himself lost in a forest, should not wander about turning this way and that, and still less stay in one place, but should keep walking as straight as he can in one direction, never changing it for slight reasons even if mere chance made him choose it in the first place. (1:123; AT 6:25; see also 3:97; AT 2:35)

This looks like a familiar principle for decision making under uncertainty, one which can arguably be known *a priori* and with certainty (*pace* Gilson 1947: 243). In this it is like the principle mentioned earlier when Descartes said, “it is a *most certain truth* that when it is not in our power to discern the truest opinions, we must follow the most probable” (my emphasis). So the demand for certainty is met by the principles of practical reason (compare Wolterstorff 1996: 181 and Marshall 1998: ch. 2).

To sum up, when Descartes says that his doubts apply to “the investigation of truth” and not to “the actions of life” he is not suggesting that belief should be abandoned only in science and not in life. Rather, he means us to abandon belief across the board while planning the actions of life with a quite different tool: conjecture. Both belief and conjecture “aim at the truth,” yet while we can use fallibilist norms to govern our conjectures, we cannot use them to regulate our beliefs. That is why the Cartesian doubt undermines our convictions without hobbling our practical reasoning.

Descartes's Suppositions

Having laid out his provisional moral code in Part Three, Descartes begins Part Four of the *Discourse* as follows:

Since I now wished to devote myself solely to the search for truth, I thought it necessary to do the very opposite and reject as if absolutely false everything in which I could imagine the least doubt, in order to see whether I was left believing anything that was entirely indubitable. (1:126–7; AT 6:32)

Here Descartes is going beyond mere agnosticism. He “supposes” that nothing is such as our senses make it appear, that all the arguments he had previously taken to be demonstrative are unsound, and resolves “to pretend that all the things that had ever entered my mind were no more true than the illusions of my dreams” (*ibid.*). It is one thing to abandon ordinary beliefs because they are uncertain, quite another to imagine or “pretend” that these beliefs are false. Yet this pretence is also recommended towards the end of the First Meditation (2:15; AT 7:22).

Clearly, we must distinguish two rather different cognitive attitudes – conjecture and supposition – both of which Descartes employs during that phase of his intellectual journey which follows the abandonment of belief and only one of which is intended as a practical substitute for belief. Conjecture aims at truth in a way that supposition does not: a false guess is failure as a guess, a false supposition is no failure as a supposition. Whilst one can assume for the sake of argument something that one believes to be false, one can't sincerely conjecture or guess that p when one believes that not- p . Conjectures are constrained by probability, suppositions are not (Owens 2003: 290).

For action we need probable conjecture, not mere supposition. So when Descartes lays down which opinions he should use to govern the skeptical phase of his life, he is concerned with adopting conjectures and not with making suppositions. But once he has a background of opinion in place, he opens Part Four with the announcement that it would be sensible to make certain suppositions in order to pursue one of his practical projects, the search for knowledge. As Descartes explains in the Fifth Replies:

it is often useful to assume falsehoods instead of truths in this way in order to shed light on the truth, e.g., when astronomers imagine the equator, the zodiac, or other circles in the sky, or when geometers add new lines to given figures. (2:242; AT 7:350)

But how can mere supposition help him in the search for knowledge? I suspect supposition plays more than one role for Descartes and I shall consider only the most important of them.

Imagine Descartes finds himself feeling quite certain of something, perhaps of a mathematical demonstration. Descartes tells us that “my nature is such that so long as I perceive something very clearly and very distinctly I cannot but believe it to be true” (2:48; AT 7:69); it looks as if he can't doubt the demonstration. (See also 2:25; AT 7:36 and 1:207; AT 6:21.) Yet, in the First Meditation, Descartes notes that “others go astray in cases where they think they have the most perfect knowledge” and asks “may I not similarly go wrong every time I add two and three or count the sides of a square, or in some even simpler matter, if that is imaginable?” (2:14; AT 7:21; see also 1:194; AT 8A:6). So while he may be unable to doubt the demonstration now, he can see how a time may come when some more or less subtle fallacy is pointed out to him. Does this sort of reflection provoke a doubt about what is clearly and distinctly perceived?

Various answers to this question have been canvassed and a full response would involve addressing the problem of the Cartesian circle. But on one point at least there is some agreement among commentators – things clearly and distinctly perceived cannot be doubted by the Cartesian skeptic in the sense in which those opinions which come from and through the senses can and ought to be doubted (cf. Williams 1983: 345–50; Wolterstorff 1996: 189). True, Descartes speaks of doubt in both contexts and does not explicitly distinguish two forms of doubt (2:101; AT 7:141; and 2:308; AT 7:460). But unless we make this distinction in reading him we will find it hard to explain his insistence that he can't fail to believe whatever he clearly and distinctly perceives. And there is a further point. Descartes must rely on his clear and distinct perceptions in order to carry out the *reductio* proofs with which he fends off these threatening suppositions. How could he believe in the cogency of such proofs unless he also

believes in what he clearly and distinctly perceives (Wolterstorff 1996: 214–15; Owens 2000: 126–7)?

Supposition plays a crucial role in the construction of these proofs by *reductio*. Descartes reacts to “doubts” about what is clearly and distinctly perceived by *supposing* that the proposition in question is wrong or the argument invalid and then seeing what follows from that supposition. If some absurdity follows, then he has a demonstration that no such error exists. A mere supposition or guess that they are valid would provide no basis for a firmer belief in their validity. It is precisely this strategy which Descartes employs to deal with the most radical of his skeptical hypotheses, one which occurs in both the *Principles* and the *Meditations*:

we have been told that there is an omnipotent God who created us. Now we do not know whether he may have wished to make us beings of the sort who are always deceived even in those matters which seem to us supremely evident; for such constant deception seems no less of a possibility than the occasional deception which, as we have noted on previous occasions, does occur. (1:194; AT 8A:6; see also 2:25; AT 7:36)

Reflection on this possibility is not meant to render our clear and distinct perceptions doubtful, which would be impossible. Rather, it leads Descartes to make the supposition that there is such a deceitful God in an effort to derive an absurdity from it, which he does (to his mind) successfully in the Third Meditation (2:35; AT 7:51).

There is much more to be said on the matters raised in this section. What I hope to have established is that (a) we must not confuse the conjectures which govern the life of the Cartesian skeptic with the suppositions which he makes in the course of it and (b) we must distinguish the doubts which force the Cartesian skeptic to adopt conjectures in place of his former beliefs from the “doubts” which are resolved by supposing that what is clearly and distinctly perceived might be false.

Note

- 1 In Passage [A] Descartes says the absence of persuasive reasons “obviously implies that I am indifferent as to whether I should assert or deny either alternative, *or indeed refrain from making any judgment on the matter*” (my emphasis). According to this final clause, I am indifferent not only about what to believe but also about whether to form any belief on the matter at all. Yet Descartes concludes Passage [C] by saying that I *ought* to suspend belief in these circumstances. So how can indifference as such be indicative of the absence of a reason? This difficulty might tempt someone to read “indifference” as referring to a power of choice, a power which I have regardless of my reasons. But Descartes is quite clear that indifference is something which I feel “when there is no reason pushing me one way or the other” and that “if I always saw clearly what was true and good . . . it would be impossible for me ever to be in a state of indifference” (2:40; AT 7:58; see also 3:245; AT 4:173; and 3:233; AT 4:115). The way out of this difficulty is to read “indifference” here as referring to an indifference of the intellect: our intellect provides no indication as to what we should do with our power of assent. It does not follow that the will feels indifferent between assenting and not assenting: where we have no guidance from the intellect, we see that we ought not to assent.

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Chapter 11

Self-Knowledge

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Descartes made one of philosophy's best-known claims: *ego cogito, ergo sum*; "I think, therefore I am" (1:195; AT 8A:7). He thought that "anyone who philosophizes in an orderly way" would have to grasp this truth as "the first and most certain" (*ibid.*). He went on to argue that the "I" whose existence is discovered through the *cogito* is best thought of as a thing that thinks. In the Second Meditation, he explained what such a thing is. It is "certainly a thing that doubts, understands, affirms, denies, is willing, is unwilling" (2:19; AT 7:28); Descartes thinks a meditator will find it fairly easy to see that these are so many different ways of thinking and that he can ascribe them to himself with certainty. It is more difficult for the meditator to come to see that a thinking thing is also "one that imagines and senses," but he finds that, conceived properly, his imaginings and sensings are also thoughts that he can ascribe to himself with certainty (*ibid.*). When Descartes's meditator recognizes what he knows about himself, and the certainty with which he knows it, he remarks, "I know plainly that I can achieve an easier and more evident perception of my own mind than of anything else" (2:23; AT 7:34). In subsequent meditations, he argued that by starting with his understanding of himself, he can go on to acquire knowledge of God, mathematical truths, and truths about the existence and nature of the physical world: his grasp of truths about himself enables him to establish all the basic truths that together constitute "first philosophy," as the title of the *Meditations* puts it.

There can be no question that Descartes gave self-knowledge some sort of special role to play in our efforts to arrive at a proper understanding of the rest of reality. But exactly what role did he give it, and why? According to a number of readers, Descartes saw our knowledge of our own minds as playing its special role in virtue of its having a special constellation of features. (For example, see Williams 1978: 32–101, 305–8; see also Rorty 1979. For criticism of Rorty's historical narrative, see Hatfield 2001.) Our knowledge of our own minds is certain: I cannot doubt my beliefs about my own existence and my own thoughts. It is incorrigible: I cannot go wrong in my beliefs about my existence and thoughts. It is immediate: I have knowledge of my own thoughts simply by being aware of them; I do not find out about them by first finding out about something else. It is evident: if I think something, then I know what thought I am having. And because it has these special features, self-knowledge is pivotal in the sense that it is foundational: my knowledge of my own existence and my own mental states

provides me with indispensable premises from which I infer my knowledge of everything else.

While all of these interpretative claims can find at least some support in the texts of Descartes's philosophical writings, many of them are controversial. Although many readers of Descartes hold this view of his account of self-knowledge, few Descartes scholars today would accept it in its entirety and without reservation. But no clear scholarly consensus has yet emerged about what account of self-knowledge Descartes *did* offer. My purpose in this chapter is not to try to settle the scholarly debate, but to explore some of the interpretative and philosophical questions with which the debaters must grapple.

I will begin by taking a quick look at the *Rules*, where Descartes first articulates some themes that prove to be important in his later thought. After that I will be mainly concerned with the *Meditations*. To explore the certainty of self-knowledge, I will look briefly at the First Meditation and then consider several passages in the Second Meditation. To see whether Descartes thinks of self-knowledge as incorrigible and immediate, I will explore his conception of self-consciousness. I will pursue a question about the evidentness of self-knowledge by asking what Descartes thinks we can know about the *kinds* of thoughts we are having. Finally, I will consider whether the priority of self-knowledge is, for Descartes, best captured by the claim that it is foundational.

Themes in the *Rules*

Even in the early *Rules for the Direction of the Mind*, Descartes conceived of the mind as the unified locus of all of our cognitive activity. In Rule 12, he explains that, unlike animals, we have a single cognitive power that “in the strict sense is purely spiritual,” but that is able to operate in several ways:

When applying itself along with [corporeal] imagination to the [corporeal] “common” sense, it is said to see, touch etc.; when applying itself to the [corporeal] imagination alone . . . it is said to remember . . . or to imagine or conceive; and lastly, when it acts on its own, it is said to understand [*intelligere*]. (1:42; AT 10:415–16)

In the *Rules*, Descartes often uses the term “intellect” to mean this single wide-ranging cognitive power whose exercise is essential to human sensing, remembering, imagining, and understanding. The *Rules* is meant above all to guide the cognitive operations of remembering and imagining, in which our cognitive power is engaged with a part of the brain Descartes calls the *phantasia*, or corporeal imagination. But he adds that when our cognitive power “acts on its own,” it is able to cognize things by means of a “sort of inborn light, without the aid of any corporeal image”; this is the sort of cognition that can “represent for us what cognition [*cognitio*] or doubt or ignorance is, or the action of the will . . . and the like” (1:44; AT 10:419). Although such cognition does not involve any “corporeal image,” “yet we have real cognition of all these, cognition that is so easy that to have it, all we need is to share in reason” (1:44–5; AT 10:419). When we have such cognition, we are using our *pure* intellect: we are using our cognitive power insofar as it operates independently from corporeal images.

In some ways, this early theory of cognitive power seems to have a kinship with Aristotelian theories of cognition, but cognitive power seems also to be an ancestor of the “thinking” that Descartes reflects upon in the Second Meditation. How close an ancestor is not clear. In the *Rules*, Descartes appeals to the cognitive power acting “on its own,” in independence of our brains, to explain how we can cognize our cognition, doubt, ignorance, and acts of the will; but he does not discuss, as he does later, our cognition of our own acts of sensing, imagining, and remembering. Nor does he say, as he does later, that our cognitive power, acting on its own, can enable us to understand extension, the essence of matter. In at least these ways, his later theory differs from the proto-theory in the *Rules*.

Self-Knowledge and the Method of Doubt

Descartes develops his account of self-knowledge most fully in the *Meditations*, to which I now turn. In its predecessor, the *Discourse*, Descartes had been reluctant to say very much about skepticism, and that, he believed, was the reason why the *Discourse* account of self-knowledge was unsatisfactory (3:55; AT 1:353). But in the *Meditations*, he developed the methodological role of skepticism more fully, and the account of self-knowledge that he gave, especially in the Second Meditation, seems to be closely bound up with scope of skeptical doubt. Let me rehearse some aspects of doubt that we will want to consider.

In the First Meditation, the meditator resolves to withhold his assent from any of his beliefs for which he finds the least reason for doubt. Upon reflection, he finds reasons for doubting an astonishing range of beliefs. He considers the radical skeptical hypothesis that he has been created by an omnipotent God who has

brought it about that there is no earth, no sky, no extended thing, no shape, no size, no place, while at the same time ensuring that all these things appear to me to exist just as they do now. (2:14; AT 7:21)

He continues:

What is more, since I sometimes believe that others go astray in cases where they think they have the most perfect knowledge, may I not similarly go wrong every time I add two and three or count the sides of a square, or in some even simpler matter, if that is imaginable? (*Ibid.*)

He can see no way in which to rule this hypothesis out, and so it serves as a ground for withholding assent to an extremely wide range of beliefs.

Indeed, at the beginning of the Second Meditation, the meditator asks himself whether there remain any propositions at all to which he can give his assent. If he puts to one side all that he can doubt, “what remains true? Perhaps just the one fact that nothing is certain” (2:16; AT 7:24). But on the radical skeptical hypothesis of the deceiving God, there is at least “a God, or whatever I may call him, who puts into me the thoughts I am now having” (*ibid.*): does that not suggest that I cannot doubt

whether God exists? To this, the meditator replies, “I myself may perhaps be the author of these thoughts” (*ibid.*). And that then raises in his mind the question whether his belief in his own existence, rather than his belief in the existence of God, is one that can withstand his most concerted efforts to find reasons for doubting his beliefs. If it does withstand his doubting, then he will be able to be absolutely certain that he exists: he will have established that his most concerted effort to find reasons for doubt fails to provide a reason for doubting whether he himself exists.

Earlier, I quoted the passage in the *Principles* in which Descartes says that knowledge of one’s own existence is “the first and most certain of all to occur to anyone who philosophizes in an orderly way.” The “orderly way” he has in mind is the way we philosophize when we start by withholding assent to all beliefs for which we can find any ground for doubt; and our knowledge of our own existence is “first and most certain” at least in the sense that we cannot doubt our own existence even when we use the most radical skeptical hypothesis to call our beliefs into doubt. I will return to this point in the last section of this chapter.

Our Knowledge of Our Existence

In the Second Meditation, the meditator arrives at certainty about his own existence through a set of reflections that take the form of an internal dialogue:

I have convinced myself that there is absolutely nothing in the world, no sky, no earth, no minds, no bodies. Does it now follow that I too do not exist? No: if I convinced myself of something then I certainly existed. But there is a deceiver of supreme power and cunning who is deliberately and constantly deceiving me. In that case I too undoubtedly exist, if he is deceiving me; and let him deceive me as much as he can, he will never bring it about that I am nothing so long as I think that I am something. So after considering everything very thoroughly, I can establish this proposition: *I am, I exist*, is necessarily true whenever it is put forward by me or conceived in my mind. (2:17; AT 7:25)

While the thought Descartes expresses here may be intuitively accessible and persuasive, this passage contains some surprises and puzzles for careful readers.

One big surprise is that nowhere does Descartes have the meditator say, “I think, therefore I am.” The closest to the *cogito* formulation that the meditator comes is this claim: “If I convinced myself of something, then I certainly existed.” But convincing myself of something is only one of many ways of thinking: the meditator does not really make the broader claim here. The claims he goes on to make are narrower still (here I paraphrase): “If God is deceiving me, then I exist,” “If I am having the thought that I am something, God cannot bring it about that I am nothing,” and “Whenever I so much as conceive *I exist*, *I exist* must be true.” (These last two claims are narrower because they specify what it is that I am thinking about: my existence.)

We are bound to be puzzled if we reflect on the “if . . . then” structure of the claims in which Descartes moves from thought to existence. It suggests that the meditator is drawing some sort of inference, one that starts with “I think (or convince myself)

(of thus-and-such)" and draws from that the conclusion "I exist." Gassendi writes: "You could have made the same inference from any one of your other actions, since it is known by the natural light that whatever acts exists" (2:180; AT 7:259). Descartes replies that this is not true, because

I am not wholly certain of any of my actions, with the sole exception of thought. . . . I may not, for example, make the inference "I am walking, therefore I exist," except in so far as the awareness of walking is a thought." (2:244; AT 7:352)

For example, if I have been created by a deceiving God, then I have reason to doubt whether I am actually walking, or even have a body, when I take myself to be walking. But, Descartes says here, what I *can* be absolutely certain of is that I think I am walking. And this suggests that Descartes's meditator can be certain that he exists *because* he can be certain he thinks: the "if . . . then" structure seems to be one that passes certainty along from one's grasp of the "if" clause to one's grasp of the "then" clause. But – and here is the puzzle – the meditator establishes with certainty that he thinks only *after* he establishes his certainty that he exists. In the intervening paragraphs, he works hard to discover what precisely thinking is, and it is only as he figures this out that he comes to see that he can be certain he thinks.

Partly in reaction to such surprises and puzzles, some readers surmise that in the *cogito* passage itself, Descartes did not intend to derive certainty about "I exist" from certainty about "I think," but instead intended to bring out some other aspect of our knowledge of our own existence. Some have thought he was trying to make the point that there is something peculiarly self-defeating about my thinking the thought "I do not exist" and, by the same token, something peculiarly self-verifying about my thinking the thought "I do exist." On this "performative" interpretation, we would see my thinking the thought "I exist" as being like my saying the words "I am speaking." (See Hintikka 1962; for criticism, see Frankfurt 1966.) One challenge for this interpretation is to explain the intimate connection that Descartes appears to be drawing between the meditator's claim to know that he exists and his efforts to doubt as much as possible.

A different way to interpret Descartes would be to see him as suggesting that he cannot doubt his own existence because his own existence is a condition of the possibility of raising radical doubts about anything. Suppose, for example, that Descartes believes we can raise a radical doubt about a given belief only if we can construct a skeptical hypothesis about it, and that any skeptical hypothesis will have to offer a scenario in which I am having the belief in question and yet for some reason it is false. (For example, I am being systematically deceived by my creator.) But then one skeptical hypothesis I cannot coherently construct is a skeptical hypothesis about my belief that I exist, because I cannot include in it both myself believing that *p* and the falsity of my belief that *p*. But if I cannot raise a radical doubt about "I exist," then I can be absolutely certain that I exist. (See Curley 1978: 70–95; Broughton 2002: 108–19.)

This way of seeing the certainty of our knowledge of our own existence draws a very tight connection between methodological doubt and self-knowledge. As we will see in a moment, we might also read Descartes as making a tight connection between doubt and our knowledge of our own thoughts.

Certainty About Our Thoughts

After finding that he can be certain he exists, the meditator immediately raises the question what this "I" is of whose existence he can be certain. He seeks a characterization of this "I" to which he has so far referred in only the vaguest of terms. He develops his characterization by exploiting aspects of his method of doubt: he has believed a number of things about himself up until now, but because he has resolved to assent to nothing about which he can raise a doubt, he seeks a characterization of this "I" that excludes anything doubtful.

He had thought of himself as a soul plus a body: the body being what he has in common with a corpse, and the soul being an ethereal something that carries out the functions of life (like nourishment and locomotion), along with sensing and thinking. (There may be significance in the similarity between this conception and the conception of human beings elaborated in some Scholastic philosophy; see Carriero 1986.) Because he has withheld assent to the existence of anything corporeal, the meditator excludes the body from his characterization of himself; that leaves the soul and its activities. From the soul's activities he excludes the functions of life: someone cannot eat or move around without a body. And he also excludes sensing, on the grounds that sensing too requires a body; for example, seeing requires eyes (e.g., 1:195; AT 8A:7).

What is left in the meditator's original conception of himself? Apparently just the ethereal soul and one of its activities: thinking. Descartes reflects upon the soul and its thinking in turn. He had conceived of his soul as something very attenuated that permeates his body. Even though such a ghostly soul would be nothing visible or tangible, still it would be something spread through the body, and thus it would have a location and shape. Descartes concedes that for all he has discovered so far, his soul may well be some such ethereal thing, just as for all he has discovered so far, he may well have a body. But all the same, his doubt requires him to exclude from his conception of himself not only his body, but also his soul insofar as he thinks of it as physical, as having a location and shape.

The meditator has pared down his former conception of himself to what appears to be a mere nubbin: something-or-other that thinks. But now the meditator explores what it is to think, and his conception of himself emerges as one that is richer than we might have expected. In the paring-down phase, he described thinking as the activity of "a mind, or intelligence, or intellect, or reason" (2:18; AT 7:27), and he contrasted it with sensing (and by implication, with imagining). But now he reconceives imagining and sensing as activities that he can conceive of without conceiving of a body, and when they are understood in this new way, they count as "thinking" too. This is a point the meditator makes in a passage from which I quoted at the beginning of this chapter: "But what then am I? A thing that thinks. What is that? Certainly a thing that doubts, understands, affirms, denies, is willing, is unwilling, and also one that imagines and senses" (2:19; AT 7:28).

When the meditator conceives of all of these activities just as ways of thinking, he can attribute them to himself with absolute certainty. And, as he immediately goes on to say, he also finds that he can be certain, not just about propositions like "I am

doubting” or “I am sensing,” but also about propositions like “I am doubting whether I am seated by a fire” or “I am seeing a computer screen” (at least where “sensing” and “seeing” are construed in the new and narrower way). That is, he can be certain about at least some claims concerning the kind of mental state he is in and the content his mental state has.

In the rest of this section, I will explore the certainty of knowledge about the contents of our mental states. In the next section, I will look at what Descartes says about self-consciousness in order to pursue some related questions about the incorrigibility and immediacy of such knowledge.

Why does Descartes think we can be certain that our ascriptions of mental states to ourselves are true? Let us consider an example. Here I am, sitting here in front of my computer, staring at the screen. Suppose I make the following claim: “I am seeing a light.” Is Descartes saying that I can be absolutely certain that I am indeed seeing a light? Well, first I must reconceive seeing so that “I see a light” does not imply “I am using my eyes” (or, for that matter, “There is a light-source in front of me”). Here is how the meditator puts things:

[I]t is . . . the same “I” who senses or takes notice of bodily things as it were through the senses. For example, I am now seeing a light, hearing a noise, feeling heat. But I am asleep, so all this is false. Yet I certainly *seem* to see, to hear, and to be warmed. This cannot be false; this is what is properly called sensing in me, and this, taken in this way, with precision, is nothing other than thinking. (2:19; AT 7:29)

Here I am to reflect upon my current experience to identify what I would until now have called *seeming to see* a light. This is a state I can find myself in when I am asleep in a dark room and not using my eyes; Descartes is saying that I am in that same state when I see a light. He does not deny that there is a difference between what is going on when I dream I see a light and what is going on when I really do see a light, but he implies that the difference concerns only such facts as whether my eyes are open, a light-source is stimulating my retinas, and so on. These are physical facts about the causal chain involved in seeing. Descartes apparently holds, then, that two mental states whose intrinsic features are exactly the same can have different kinds of physical causes. Indeed, Descartes may be prepared to say that there can be two mental states with exactly the same intrinsic features even though one has a physical cause and one has a cause that is non-physical. (This is perhaps implied by some of the details of the Sixth Meditation argument that my sensations are in fact caused by corporeal things.)

So, if by “seeing” I mean just the state that I can also be in during a dream, then it is Descartes’s view that when I am seeing a light, I can be certain I am seeing a light. But exactly why am I entitled to say I have certainty when I make this self-ascriptive claim? There are at least two broad kinds of answers we might try to give to this question. One would be to explore what happens if we try to use the First Meditation skeptical hypotheses to call into doubt the self-ascriptive claim. Another would be to look more closely at the way in which self-ascriptive claims issue from the capacity for self-awareness that enables us to ascribe our own mental states to ourselves.

Suppose a powerful creator is doing his utmost to deceive me. Could he make me believe I am seeing a light, when really I am not seeing a light? Of course, one thing he could do is make me falsely believe I have eyes, and that there is a light-source in front of me, and that I am using my eyes to see the light-source. But our question is whether he could, to use our old way of speaking, make me falsely believe that I *seem to see* a light. Descartes's meditator clearly thinks the answer is "no," and probably many of us would agree. Some people might hold that this answer does not call for defense or explanation, though others might think that we should be able to say why the deceiver hypothesis cannot touch this sort of judgment. It is not entirely clear which of these responses Descartes would want to give.

If he thought we should be able to explain or defend the claim that I can be certain that I seem to see a light, how might he try to do it? In the example we are considering, the deceiver is supposed to be making me go wrong about a judgment like "Here is a light." The kind of judgment we are concerned with here is what we might call a *perceptual* judgment. A perceptual judgment is, at minimum, a judgment about the way things are outside my mind, and one that I base, not on whim, guesswork, or imagination, but on some sort of experienced impression. Here, my judgment that a light is present is based on a "light-here" impression. So how might the deceiver make me go wrong about a perceptual judgment? He couldn't do it by somehow making it false that I have a "light-here" impression; then I would not be making a perceptual judgment and would not be going wrong about a perceptual judgment. All he can do is to ensure that my "light-here" impression is not a sensation of a light, where that implies that a light is present and that I have eyes to see it. So if the skeptical hypothesis is about a perceptual judgment, it has my "light-here" impression built right into it. Thus, if the skeptical hypothesis is about a perceptual judgment, it cannot call into doubt my belief that I am having a "light-here" impression. And such an impression just is (or is very similar to) the pared-down sensation that Descartes says we cannot doubt.

But does this line of thought explain the claim that I can be certain I seem to see a light? I don't think so. Even if we grant that my having the "light-here" impression is a precondition of my making a perceptual judgment, and thus is built into any skeptical hypothesis about a perceptual judgment, that does not explain why we should regard the judgment "It seems to me that I am seeing a light" as indubitable. After all, *it* is not a perceptual judgment, because it is not a judgment about the way things are outside my mind.

Granted, there is something very odd about saying, for example, "Perhaps a deceiver is making me believe that it seems to me that I am seeing a light, when really it doesn't seem to me that I am seeing anything." But exactly what is it about this that is odd? To answer that question, perhaps we could try to produce a line of thought about the belief that I seem to see a light that would be similar to the line of thought I just sketched for the perceptual judgment that I am seeing a light. But Descartes himself does not appear to pursue this option in the passage we have been considering. My suspicion is that he thought it was obvious that the judgment that I am having such-and-such an impression is an indubitable one. What he thought was in need of demonstration was that when I call a perceptual judgment into doubt, I do not thereby call into doubt the judgment that I am having a related impression.

Self-Awareness and Knowledge of Our Thoughts

If we want to know why Descartes thinks that self-ascriptive claims can amount to knowledge, we might want to turn from the question how they fare when subjected to radical doubt and instead ask how Descartes thinks they issue from the reflexive cognitive activity that enables us to ascribe our own mental states to ourselves. (“Reflexive” mental operations are those that are turned upon the mind itself.) Many readers believe that for Descartes, it belongs to the very nature of thinking that we are aware of all of our thoughts, and that this awareness constitutes an incorrigible and immediate knowledge of our thoughts. And many readers would say that in the end, Descartes’s reason for supposing that we are entitled to certainty about our self-ascriptions of thoughts is that thought has this special nature.

In the Second Replies, Descartes writes that “thought” is a term that he uses

to include everything that is within us in such a way that we are immediately aware [*conscii*] of it. Thus all the operations of the will, the intellect, the imagination and the senses are thoughts [*cogitationes*]. (2:113; AT 7:160)

(He uses “immediately” here to rule out what is within us as a consequence of thoughts, like the voluntary movements of our bodies that originate in thoughts.) He goes on to say that an “idea” is “the form of any given thought [*cogitationis*], immediate perception [*perceptionem*] of which makes me aware [*conscius*] of the thought” (*ibid.*). By “perception,” he does not mean sensation; indeed, as we will see, he does not identify the perception of an idea with any kind of thought, but instead thinks of it as an element within the structure of thought. Perhaps we can capture the notion of immediately perceiving the form of a thought by saying that it is *grasping* the “form” of the thought.

So particular instances of thought – of sensing, willing, understanding, and so on – have something in common: in each case, we are aware of our thought by immediately perceiving an idea, or the “form” of the thought. This notion of “form” is an unfamiliar one today, although the terms “idea” and “form” had often been used interchangeably in the philosophical tradition that Descartes inherited. He says more about his notion of “form” in the Third Meditation, where he writes:

Some of my thoughts are as it were images of things, and it is only in these cases that the term “idea” is strictly appropriate – for example, when I think of a man, or a chimera, or the sky, or an angel, or God. Other thoughts have various additional forms; thus when I will, or am afraid, or affirm, or deny, there is always a particular thing which I take as the object of my thought, but my thought includes something more than the likeness of that thing. (2:25–6; AT 7:37)

The word “additional” suggests that *all* thoughts have a form in virtue of being “as it were images of things,” though some thoughts may also include “additional forms.” As Descartes makes clear in the Second Replies, these ideas or images are in the mind, not the brain; and as the inclusion of God and an angel on the Third Meditation list suggests, ideas or images need not be imaginings of something corporeal. Perhaps one

way to capture what Descartes has in mind is to say that ideas or images represent something to the mind that is immediately perceiving them. Taken together, these passages from the Second Replies and the Third Meditation suggest that *all* thoughts are instances of the immediate perception or grasp of a representation, a perception or grasp by which we are made conscious of the thought. (For more about the notion of “form” and its history, see Alanen 2003: ch. 4.)

Let us consider an example: suppose I imagine a dragon. I am having a thought, and the thought has a dragon-form, i.e., it is a thought of a dragon. And by immediately perceiving a dragon-idea, or grasping a representation of a dragon, I am made conscious of my thought, that is, I am made conscious of my thinking of a dragon. Notice that Descartes seems to distinguish between the thought (the imagining of a dragon) and my being conscious of the thought; but in the passage from the Second Replies he also seems to say that *necessarily* whenever I have a thought, I am conscious of having it, and whenever I am conscious of having a thought, I am having that thought. (See also 2:33–4; AT 7:49; and 2:77; AT 7:107; and 2:171–2; AT 7:246. Here and in the next two paragraphs I am following Radner 1988; see also Miles 1999: chs. 6, 8, 15.)

Hobbes wondered whether Descartes had committed himself to an infinite regress, with every thought accompanied by a thought of that thought, and of *that* thought, and so on (2:122–3; AT 7:173). Of course, Descartes denied that he had (2:124; AT 7:175–6), but he does not make his grounds for saying this entirely clear. To the extent that he distinguishes between thinking and being conscious, we can perhaps see what his grounds might be. While necessarily I am conscious of having any thought that I have, this consciousness does not constitute another *thought*; for example, in imagining a dragon, I am conscious of having a thought of a dragon, but I need not be having a *thought* of myself having a thought of a dragon. That is not to say that I cannot have a thought of a thought: the meditator certainly has thoughts of his thoughts as he attributes his thoughts to himself, sorts through them in various ways, recalls them, and so on. Rather, what Descartes would be denying is that in having a thought, we necessarily also have a thought of that thought.

Where does this leave us in our effort to understand the special nature of self-ascriptive judgments? If Descartes conceives of consciousness and thought in the way I have just sketched, then somewhat surprisingly, if we want to explain why Descartes held that self-ascriptive judgments can be known with certainty, we cannot do it simply by appealing to his account of consciousness and thought. For while on this account it belongs to the very nature of thinking that we are conscious of all of our thoughts, this consciousness does not constitute *knowledge* of our thoughts. We have *knowledge* of our thoughts only when we make judgments about them, and in order to make judgments about our thoughts, we must have thoughts of our thoughts. Notice that this also means that although we may be immediately aware of all our thoughts, this consciousness does not itself constitute immediate *knowledge* of our thoughts.

I do not doubt that Descartes believed our consciousness of our thoughts played a crucial role in our knowledge of our thoughts and also in the certainty we can achieve in making self-ascriptive judgments (see 1:195; AT 8A:7), and I will return to this point presently. But what Descartes does not supply is an account of *how* the consciousness that is built into thought enables us to achieve certainty when we make self-ascriptive

judgments. It is important to note that if he had supplied such an account, it might have needed to leave room for the possibility of error in self-ascriptive judgments: after all, just as my thoughts about DNA may be erroneous (they might be unclear, for example), so too may my thoughts about my thoughts be erroneous (*they* might be unclear, too). This suggests that we should be cautious about reading Descartes as a philosopher who holds that we cannot be wrong in the judgments we make about what our thoughts are. He might prefer to say that such judgments may be just as corrigible as any others. (For some different considerations pointing to a similar conclusion, see Wilson 1978: 150–65.)

In the Second Meditation, I think Descartes does mean to claim that we can be certain in making judgments that ascribe thoughts to ourselves, at least when we think clearly and carefully about exactly what we can ascribe to the mind. But there is little to suggest either why such judgments resist the deceiving God hypothesis, or why self-awareness gives them a special epistemological status. I would add, however, that in the large project of the *Meditations*, Descartes rests relatively little on the certainty of such judgments. He seems instead to be much more concerned to have the meditator clarify his thoughts and identify their objects or causes. So perhaps it should be no surprise that he did not explore the grounds for certainty about self-ascriptive judgments more thoroughly. (See Wilson 1978: 75–6.)

The Extent of Our Knowledge of Our Thoughts

We have already seen one reason for wondering whether Descartes would want to say that we have knowledge of all of our thoughts: while he does believe that we have *consciousness* or *awareness* of all of our thoughts, he does not think that this consciousness, by itself, constitutes knowledge. Passages like this one should give us further pause: “[B]elieving something and knowing that one believes it are different acts of thinking, and the one often occurs without the other” (1:122; AT 6:23). There are several lines of thought we could follow out to see whether Descartes regards self-knowledge as being, in some sense, evident. The specific question I want to raise here is whether he wants to say that self-consciousness gives us knowledge of what *kind* of thought we are having. Does he hold that thinking about our thoughts reveals to us that we are sensing, willing, understanding, and so on? My suspicion is that the answer will vary depending upon the kind of thought we are considering.

Let me begin by saying something about the relation between thinking and the exercise of the faculty of intellect. This will help me to describe some salient ways in which all thoughts are alike, and some ways in which some types of thoughts differ from others.

As we saw in passages from the Second Replies and the Third Meditation, Descartes holds that thoughts are instances of the immediate perception or grasp of a representation, a perception or grasp by which we are made conscious of the thought. The fact that all thoughts have this structure may help to explain why Descartes says both that *thinking* constitutes his essence (2:54; AT 7:78) and that *intellect* is somehow the core of his essence, by contrast with imagination or sensation (2:51; AT 7:73; and 2:54–5; AT 7:78–9). If the grasp of a representation is an intellectual act, then we can see why

Descartes would say that “there is some intellection included in the formal concept” of even my faculties of imagination and sensation (2:54; AT 7:78). But although those faculties include something intellectual, they are ones that I exercise as an embodied mind. I could be separated from my body, without imaginative and sensory thoughts, and nonetheless think, because I would still be able to have purely intellectual thoughts. Purely intellectual thought is special in this way; nonetheless, *all* of my thoughts share a general structure, because they are all instances of the immediate perception or grasp of a representation, a perception or grasp by which we are made conscious of the thought. That is why the various kinds of thoughts that I have are so many ways or modes of thinking.

The question I want to raise now is this: to what extent does Descartes think that we can have knowledge of what *kind* of thought we are having, simply by reflecting upon the thought itself? Suppose that I think about God and then reflect upon that thought, producing in my mind a second thought. What can I know about the first thought simply by reflecting upon it? Well, in having the first thought, I was made conscious of it by grasping a representation of God. By reflecting upon it, I am conscious of a second thought by grasping a representation of the first thought; the representation that I grasp in my second thought is a representation of the fact that I was made conscious of my first thought by grasping a representation of God. My second thought, according to Descartes, affords me knowledge of my first thought. What I know is that I was made conscious of a thought by grasping a representation of God.

Now suppose that I imagine a triangle and that I then reflect upon *that* thought. Again, what can I know about the first thought simply by reflecting upon it – simply by having a second thought that is a thought of the first one? The answer would appear to be that what I know is that I was made conscious of a thought by grasping a representation of a triangle. But we would give exactly the same answer if we asked what I can know about a different kind of thought: my non-imaginative, purely intellectual thought of a triangle. The question, then, is whether our awareness of our thoughts can somehow also provide us with knowledge about what *kind* of thought we are having.

The Third Meditation passage implies that, for example, if I am desiring ice cream, or fearing ice cream, or asserting the existence of ice cream, then my volition, emotion, or judgment is itself a “form” included in my thought. Thus the fact that I am desiring, fearing, or asserting is something that I can know by reflecting upon my thoughts. But the Third Meditation passage does not say whether the differences among intellectual, imaginative, and sensory representations are reflected in distinctive “forms” that are available for me to grasp as I reflect upon an intellectual, imaginative, or sensory thought. Indeed, in the Third Meditation, the meditator says that some of his ideas appear to be innate, some invented, and some adventitious, but that he cannot tell which are which until he has “ascertained their true origin” (2:26; AT 7:38). This suggests that the character of my thoughts as intellectual, imaginative, or sensory is not something that I can know about them simply by reflecting on the thoughts themselves.

This appears to be in some tension with a Second Meditation passage that we considered earlier:

[I]t is . . . the same "I" who senses or takes notice of bodily things as it were through the senses. For example, I am now seeing a light, hearing a noise, feeling heat. But I am asleep, so all this is false. Yet I certainly *seem* to see, to hear, and to be warmed. This cannot be false; this is what is properly called sensing in me, and this, taken in this way, with precision, is nothing other than thinking. (2:19; AT 7:29)

Here the meditator seems to say that these thoughts have some sort of sensory character that he comes to know simply by reflecting upon them carefully. (Somewhat similarly for imagination: "[E]ven if . . . none of the objects of imagination are real, the power of imagination is something which really exists and is part of my thinking" (*ibid.*)) Of course, the meditator is ready to grant that he is in no position to answer a question about the "true origin" of, say, his seeming to see a light: he does not know whether his thought is caused by a light affecting his sense organs, or by whatever it is that causes dreams, or by a deceiving creator. But he nonetheless seems to be saying that there is something about his thought that is distinctively sensory, and that he can discern this about the thought simply by reflecting on it. But what could this distinctively sensory something be if it is not a "form" of thought like desiring, fearing, or asserting?

Perhaps the answer is that the thought the meditator identifies as a sensation comes packaged with a distinctive second thought, one that is about the origin of the sensation. This is perhaps suggested by the phrase "as it were through the senses." Such an additional thought about origin might be all that identifies the original thought as a sensation, but I think Descartes may be prepared to say something a little stronger. Although I do not think he would say that sensations have intrinsic features that no other thoughts have, I think he might want to say that thoughts of both sense and imagination share distinctive phenomenological features that intellectual thoughts do not have: for example, the way an imagined rose looks, or the way a sniffed rose smells. And I suspect he holds that we can know that our sensations and imaginings have these phenomenological features simply by reflecting on them. That is, these phenomenological features are inseparable from the "as it were images of things" we are grasping if we are having sensations and imaginings. Indeed, in places Descartes seems prepared to say that these phenomenological features are almost all there is to the forms we are grasping if we are having sensations:

[W]hen we say that we perceive colours in objects, this is really just the same as saying that we perceive something in the objects whose nature we do not know, but which produces in us a certain very clear and vivid sensation which we call the sensation of colour. . . . As long as we merely judge that there is in the objects [which are the source of our sensations] something whose nature we do not know, then we avoid error. (1:218; AT 8A:34)

Does Descartes think that there are any differences between imaginative and sensory thoughts that we can notice simply by reflecting on them? In the Sixth Meditation, he may seem to suggest that in having sensory thoughts, we are aware of being passive, and that in having imaginative thoughts, we are aware of exerting an effort. But in fact Descartes's considered view is that while some imaginative thoughts involve volition, others – for example, dream-thoughts – do not (*Passions* 1:20–1, 26; 1:336–8; AT 11:344–5, 348–9).

None of this is to say that there are no other differences among thoughts of sense, imagination, and intellect. They differ in their “true origins”: sensations originate in objects that stimulate our sensory organs and our brains; imaginings originate in other states of our brains; and intellectual thoughts do not originate in our brains at all, but are innate in our minds. Descartes does, of course, believe that we can have knowledge, at least in many cases, of which kind of thought we are having. But to a considerable extent, this is knowledge whose basis extends well beyond reflection upon the thoughts themselves.

This section of this chapter has pursued the question of what we can know about the kinds of thoughts we are having simply by reflecting on them. Of course, it would also be well worth asking what we can know, simply by reflecting upon our thoughts, about the representations we are grasping in having these thoughts. Again, the answer may be: less than we suppose. Here, it may be important to distinguish between grasping something clearly and distinctly and grasping it obscurely and confusedly, though I will not pursue that issue here.

In this section and the previous one, I have tried to suggest that it is by no means obvious that Descartes regards self-knowledge as evident. Simply to have a thought may not be to have knowledge of what thought I am having.

The Priority of Self-Knowledge

Earlier, I said that Descartes puts relatively little weight on certainty about self-ascriptive judgments in the project of the *Meditations*. This may leave us puzzled how to understand his claim that self-knowledge plays a pivotal role in our efforts to understand reality properly. After all, near the beginning of the Second Meditation, the meditator said that “Archimedes used to demand just one firm and immovable point in order to shift the entire world” (2:16; AT 7:24), and clearly the meditator finds his own firm and immovable point in his knowledge of himself. On the usual picture of the priority of self-knowledge, I have certain, incorrigible, immediate, and evident knowledge of my own thoughts, and through a series of inferences that start with this self-knowledge, I achieve knowledge of God and the physical world. That would certainly explain why Descartes thought that self-knowledge is prior to other knowledge and pivotal for our efforts to achieve other knowledge; but if we are not entirely satisfied with this interpretative picture, how else can we understand why self-knowledge is prior or pivotal?

It is true that Descartes achieves knowledge of God through an inference that involves his idea of God, and it is also true that he achieves knowledge of the physical world through an inference that involves his sensations. But I do not think that either inference quite fits the usual foundationalist picture. If the causal argument for God’s existence is to work, Descartes must establish that his idea of God has content that could not be derived from what he knows about himself through reflection upon himself; otherwise he himself would be an adequate cause for his idea of God. But he does not establish this point about his idea by claiming immediate and complete knowledge of his thoughts; rather, it is a point that he establishes by deploying some fairly complex argumentation. And in the inference that establishes the existence of the physical

world, Descartes does not need to claim immediate and certain knowledge of his sensations; rather, the premise he needs (one of several) is that he clearly and distinctly understands that he has a passive faculty of sensing. In any case, the content of his sense-ideas does not matter to the argument, because the argument leads to the conclusion that the objects causing our sensations have the features presented, not in sensations, but in our innate ideas of extension and its modes.

I think that the priority of self-knowledge in Descartes's thought is best captured in a different way. Descartes believes that the first step in coming to understand reality is to understand the nature of our cognitive powers: what, as it were, we can understand reality *with*. This is a very general orientation that he shares with, for example, Locke, Hume, and Kant. We can see this idea even in the early *Rules*, where Descartes works through it several times in Rule 8. As he puts it in one of these efforts, "[W]e ought once in our life carefully to inquire as to what sort of cognition [*cognitionum*] human reason is capable of attaining, before we set about acquiring knowledge [*cognoscendas*] of things in particular" (1:30; AT 10:396–7). Part of Rule 8 emphasizes the value of figuring out what our cognitive powers do *not* allow us to know, so that we will not waste our time on otiose inquiries or fool ourselves into thinking we know more than we do. But Rule 8 also suggests that if we find out about our cognitive powers first, we will be able to do a better job of finding out about other things, in something like the way a blacksmith who is starting from scratch will do better if he first makes tools for himself before trying to make swords or helmets (1:31; AT 10:397).

We can see many places in the *Meditations* where self-knowledge plays a prior and constructive role in the achievement of an understanding of reality. One comes in the Second Meditation, where Descartes recognizes that his knowledge of his existence and of his thinking is not itself cognition that arises from sense or imagination. This shows him that he has another cognitive power – "the intellect alone" or "mental scrutiny alone" – with which he can cognize things (2:21, 22; AT 7:31, 43). And one moral of the passage about the piece of wax is that the exercise of this cognitive power plays a role in cognition of physical things as well as minds, which suggests that an understanding of physical reality will of necessity include a contribution from a non-sensory, non-imaginative faculty of the mind – the same kind of faculty that makes self-knowledge possible.

In the Third Meditation we find additional ways in which self-knowledge plays a special role. Descartes reflects upon his success in achieving knowledge of himself and identifies a feature that his perception of his existence and his thoughts has: it is clear and distinct. The self-knowledge he gained in the Second Meditation shows him what clarity and distinctness are, thus allowing him to formulate the key question whether everything that he perceives clearly and distinctly is something he can accept as being certain. Perhaps equally importantly, it allows him to ask, of various judgments he is inclined to make, whether they concern matters that he perceives clearly and distinctly. For example, he is inclined to think that physical things convey their likeness to him in his sense ideas, but upon reflection he realizes that this thought is not itself a clear and distinct one.

More broadly, much of the Third Meditation is a reflection upon the general structure of ideas, or the forms of thoughts. Descartes explores their representative character and their formal and objective reality, and from this flows knowledge of God's existence.

Much of the Fourth Meditation is a reflection upon the nature of our volitional faculties of thought and their distinction from our cognitive faculty of thought; from this flows an understanding of the basic norm for judgment. Much of the Fifth Meditation concerns the way in which the distinctness of our ideas enables us to understand the true and immutable natures of things. And of course the Sixth Meditation is a rich reflection upon the nature of our faculties of imagination and, especially, sensation, from which flows an understanding of our relation to the physical world.

I began this chapter by sketching a view of self-knowledge that many readers find in Descartes's philosophy: that self-knowledge is certain, incorrigible, immediate, evident, and foundational. As the interpretative issues I have explored suggest, there are reasons to wonder whether Descartes's views really fit this picture. He does seem to treat claims we make about our existence and our states as indubitable, at least when we are careful to cast these claims in austere terms, but there is little evidence that he wants to capitalize on the indubitability of these claims by using them as premises in inferences that lead to conclusions about the world outside the mind. His complex accounts of the structure of thought and the role of the intellect may suggest that reflexive thought can yield self-knowledge, but they do not conclusively show that he regarded our knowledge of our own mental states as incorrigible, evident, or immediate. He has a broad commitment to the idea that to understand reality, we must understand and develop the powers of our minds, but this is, at least *prima facie*, different from the idea that knowledge of the world requires us to survey the inner realm and reason our way from there to the outer realm.

As interpreters of Descartes, we are faced with the challenge of developing and articulating a more nuanced interpretation of the way he understood self-knowledge. While I suspect that such an interpretation will depart from the standard view in a number of ways, it may nonetheless be close enough to this standard view to merit both the praise and, especially, the criticism that the standard view has attracted over the years. That remains to be seen. But debates about the "Cartesian" view of self-knowledge would surely be sharpened if they were to acknowledge Descartes's own distinctive claims, arguments, ambitions, and assumptions. He is at once a more sympathetic and a more alien philosopher than we may take him to be.

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Chapter 12

Descartes on True and False Ideas

DEBORAH J. BROWN

Introduction

A commonly shared intuition among medieval philosophers was that the defining function of cognition was to bring the world and the mind into some kind of union, to bring the world in some fashion *into* the mind so as to make it intelligible, and in this endeavor the functions of sensation were indispensable. On the Aristotelian approach, which characterized the conservative movements in philosophy at the beginning of the seventeenth century, such a union was accomplished through transmission of the “forms” of material objects to the sensitive and intellectual faculties of the human soul. Depending on which sensory modality is operative, material objects were thought to impress their forms either directly on the sense organ or initially on the medium, typically, the air, between perceiver and perceived, in much the same way that a signet ring impresses its form but not its matter upon wax (Aristotle, *de Anima* II, 12). The most immediate objects of cognition were thus sensible qualities – accidental and changing perceptible forms – that formed the basis, somewhat mysteriously, for our knowledge of “substantial” forms, the unchanging essences of material things. The notion of “in-formation” was in this sense quite literal. The soul’s sharing through sensation the same forms as inhere naturally in material things enables it to know their natures. Descartes’s theory of sensation is revolutionary in many respects, but perhaps most so because it puts to the test this assumption that the senses deliver to the mind the modes of being of natural objects, and finds it wanting.

In its crude form, the Aristotelian in-formation theory of cognition is quite untenable. Forms cannot be *in* either the medium or the soul in the same way that they inhere in the objects of cognition. One perceives a horse without the air or the eye or the soul becoming a horse. The way a form exists in the medium or soul was thus thought by some to be analogous to the way it was present in a mirror, not by transforming the mind or the mirror into the kind of being represented therein, but inhering in some other mode of being. Aquinas refers to this non-natural mode of inherence as “spiritual” or “intentional” being (*Summa Theologiae* I, question 78, a.3; *In Aristotelis Librum de anima Commentarium* II, ch. XII, Lectio 24, 553). Since the function of the sensory faculties is to present to the mind real qualities of material things (or, allowing for anomalous cases, things that at least could be real qualities), such a view could not

countenance much error or failure in the perceptual-cognitive process. As Aristotle suggests at *de Anima* II, 6, one might be tricked into believing that some thing is white, or that a white thing is some place it is not, but what it is to perceive a whiteness is for there to *be* whiteness present to the soul.

The problem of sensory error, which Descartes sees as an inevitable problem for Aristotelians, is not the same as the problem of the unreliability of the senses or their lack of immunity from the skeptical doubts of the *First Meditation*. Were it so, the response to those doubts should be designed to restore our faith in the senses as the vehicle of knowledge. But this is not what happens. The *Sixth Meditation* proof for the existence of bodies and resolution of the dreaming doubt is meant to be consistent with a persisting skepticism about what the senses tell us about the nature of bodies. The diagnosis offered for the failure of Aristotelian empiricism is that it is based on an inadequate understanding of the nature and function of sensation. We learn from the *Sixth Meditation* that the primary function of sensation is to deliver us the world not so as to know it but to navigate it successfully as embodied agents. In this context sensory error can and easily does turn out to be a built-in feature of a successful design: a system that perceives material objects as having certain properties they may in fact lack has more perfection than one whose senses always tell the truth but fails to survive. Take seriously this idea and much can be explained about how the senses dispose us to judge incorrectly that the world is a certain way and even why we have strongly empiricist intuitions to begin with. Given our “natural impulse” to trust the senses as guides to the way the world is (2:26–7; AT 7:38; 2:53; AT 7:77), we will be disposed to think only that detectable sensory illusions and hallucinations are deviations from the norm, and fail to see the amount of error possible within the range of the normal. In particular, we will be inclined to discount the possibility that the qualities our senses present material objects as having might lack being altogether.

Descartes’s recognition of the potential for this kind of sensory error yields him a powerful and deep objection to empiricism. But it also generates problems for his own theory of ideas and threatens the internal coherence of the metaphysical system laid down in the *Meditations*. For like his Scholastic precursors, Descartes too is in the grip of the idea that cognition involves some kind of assimilation between the knower and the known, and although he disparages the doctrine of intentional forms “flitting through the air” (1:154; AT 6:85), he retains both the idea of two modes of being, suggesting that things have being in themselves (“formal being”) and as objects of thought (“objective being”), and the idea that a thought or, more precisely, an idea, is differentiated by the object that inheres in some fashion in the mind itself. A variety of terms to characterize the being of objects of thought is used fairly interchangeably: “objective being,” “objective reality,” “objective intricacy,” “objective perfection,” but whether these terms all mean the same thing requires, as we shall see, some argument (2:28–9; AT 7:41–2; 2:75–6; AT 7:104–5; 1:198–9; AT 8A:11; 1:306; AT 8B: 362–3).

When mounting his attack against empiricism, Descartes sets out to establish at least the possibility that some ideas (most likely, but not necessarily, ideas of sense) are “materially false.” Materially false ideas “represent non-things as things” (*non rem tanquam rem representant*) and are pernicious precisely because they present bodies as having qualitative properties they do not in fact have (2:30; AT 7:43). According to

Descartes's mechanical philosophy, bodies are differentiated quantitatively – by properties or “modes” such as size, shape, and motion – by reference to which all the different effects bodies have on human beings, including all our perceptions of light, colors, sounds, temperatures, tactile qualities, flavors, and smells, are to be explained (1:217–18; AT 8A:33–5). This reductionist project in the physics goes hand-in-hand with a shift towards emphasizing the biological rather than epistemological function of sensation, but none of this undermines the status of sensations as ideas, as modes of mind that present objects to the mind for its consideration, even if in a grossly confused and obscure fashion. The problem is, however, that Descartes's desire, on the one hand, to preserve a genuinely epistemological role for sensations, and his desire, on the other, to show how they might very well be false, pull him in opposite directions – towards ascribing objects to such ideas and denying that they necessarily have objects, even though they always seem to.

Exploring how Descartes resolved this tension tells us not only what his “error theory” of sensation, as it is sometimes called, is all about, but also what the very idea of an idea is for him. Before we turn to examine this tension, it will be fruitful, therefore, to step back and consider what was at stake in bifurcating the modes of reality of ideas, and what, in particular, doing so meant to Descartes.

Objective Reality in the Cartesian Framework

In the Third Meditation Descartes notes that some of his thoughts are “as if images of things” (*tanquam rerum imagines*) and it is to these that the term “idea” strictly speaking applies (2:25; AT 7:37). This statement does not commit Descartes to an imagistic theory of ideas. On the contrary, he is adamantly opposed to treating ideas as images and to any suggestion that sensory ideas resemble the bodies that cause them (1:167; AT 6:131). His point in referring to ideas “as if images” is rather that an idea is defined by its relationship to an object – “as when I think of a man, or a chimaera, or the sky, or an angel, or God,” an idea exists within me (2:25; AT 7:37). Only because of this relationship is it appropriate to speak of truth or falsity in connection with ideas. When Descartes considers from the skeptical standpoint what he can know from his sensations, his conclusion is that it is only when considered as affective modes of mind, as “thoughts” broadly construed, that sensations cannot be mistaken and that the verb “to sense” (*sentire*) properly then applies (2:19; AT 7:29). Considered this way, as affections of the mind, the truth or falsity of a thought is not at issue. The term “idea” is reserved for those occasions when one is thinking of thoughts strictly in relation to their objects, and it is only then that questions concerning their truth or falsity can arise.

The definition of “idea” in the geometrical exposition of the arguments in the *Second Set of Replies* is subtly different from this. There he writes: “by the name ‘idea,’ I understand that form of any thought (*cogitatio*) through the immediate perception of which I am conscious of that very thought (*cogitatio*)” (trans. alt. 2:113; AT 7:160). Although Descartes does not explicitly say so in this passage, the use of “form” in this context, given its Scholastic heritage, suggests that what gives form to a thought is the identity of its object, which enables the mind to identify precisely which thought it is having.

I might be aware of other features of my thought besides its object – for example, whether it is an operation of willing, fearing, judging, and so on – but thinking in the sense of consciously understanding something is possible only because of the presence to mind of an object. Thus Descartes adds immediately that using language and understanding what one is saying entails that there is within the mind an idea of what it is that one's words signify (2:113–14; AT 7:160–1).

Early in the Third Meditation the notion of “objective reality” is introduced to account for the representational aspect of thought and for the sense in which ideas possess different degrees of reality. Ideas are unique in being measured against two scales of being. As modes of mind, all ideas have the same degree of “formal reality.” Ideas are all equally modes of an immaterial, finite, thinking substance. But considered as ideas of different things, ideas differ greatly in their degree of objective reality. Thus an idea of a substance has more objective reality than an idea of a mode and the idea of God an infinite degree of objective reality or perfection (2:27–8; AT 7:40; see also 2:117; AT 7:165–6). Descartes then uses the point that ideas inherit different degrees of (objective) reality from the objects they represent to argue for the existence of God. Extending the Scholastic principle that there must be at least as much formal reality in the efficient and total cause of an effect as in the effect to the objective reality of ideas, Descartes argues that only an infinite being could be the cause of the idea of God, which has infinite objective reality (2:27–8; AT 7:40–1; cf. Suárez, *Disputationes Metaphysicae*, disp. 26, sec. 1. 2, 5–6). The objective reality of an idea is itself something, not nothing, and thus stands in need of a causal explanation.

The merits of this particular application of the notion of objective reality do not concern us here. Notice, rather, that the emphasis in Descartes's causal argument for God's existence is on the role that objective reality plays in determining the *degree* of reality represented in an idea. This has suggested to some (e.g., Nelson 1996: 17–18) that the notion of objective reality has nothing to do with how ideas represent particular objects, but only with what degree of reality they represent and thus signals no second mode of being for objects in the mind. This interpretation, I want to argue, is mistaken. I hold with Alanen (1994) the view that the objective reality of an idea is what makes an idea to be the very idea it is precisely because it just is *the very same thing* as that which is represented by the idea, a thing which exists in a special mode of being within the mind itself. (cf. Kaufman 2000) The following considerations support this interpretation.

First, as noted above, the notion of objective reality is introduced in the Third Meditation in connection with the question of how ideas are differentiated, which in turn is connected with what they represent (2:28; AT 7:40). Ideas are not differentiated by their degree of formal reality, but neither are they sufficiently differentiated by their degrees of objective reality. The idea of God may be unique in having a degree of objective reality no other idea has, but given that every substance has the same degree of formal reality and similarly every mode, any one idea of a substance will have the same degree of objective reality as any other, and so too any one idea of a mode will be indistinguishable in its degree of objective reality from any other. So if the objective reality of an idea does not determine whether an idea represents a goat, the sun, a triangle, and so on, but signals only the degree of (objective) reality an idea has as a function of the degree of formal reality of its object, then some other story has to be told to account for what differentiates ideas from each other. It is hard to see what that story could be.

Saying that the connection between an idea and an object is forged in a judgment by the intellect seems only to shift the question to explaining how the intellect (independently!) represents the object it binds with an idea. Appealing to brute causal connections (e.g., the idea of the sun is the mode of mind triggered by perceptual stimuli originating from the sun) won't work either unless such connections can explain how it is that the mind comes to think about the sun rather than any of the more proximal stimuli in the causal chain. A more natural reading is one that takes Descartes as introducing the notion of objective reality precisely as a way of unifying mind and world. An idea is a mode of mind that, on this reading, is *identical* (in an objective mode of being) with the thing it represents.

Descartes's exchange with Johannes Caterus in the *First Objections and Replies* further reinforces this interpretation. Caterus adopts a more deflationary stance, one which he understood to be prevalent in the Schools, according to which the notion of objective reality signifies an "act of the intellect terminating in the manner of an object" which brings about no change in the external object, indeed, may not even involve any external object, and where there is no natural change there is no need of a cause (2:66; AT 7:92). Thinking about the sun does not affect the sun, and although it may be useful to designate the sun as the object of a particular thought, this extrinsic designation does not generate any new mode of being that needs to be accounted for. "Objectively existing," meanwhile, signifies nothing actual, either imaginary beings or merely conceived things or eternal truths, none of which for Caterus stand in need of causal explanation (2:67; AT 7:93–4).

Descartes's reply is highly revealing. He agrees with Caterus that no alteration takes place in the external object of thought. In relation to the external object, if one exists, "objective being in the intellect" is a mere "extrinsic denomination," but this is irrelevant. (I can say that I see the cat in the mirror without thinking that this alters the cat in any way, but none of this obviates the need to explain how the mirror presents the cat.) In speaking of objective being, Descartes asserts that he is instead speaking of an idea which "is never outside the intellect, and in this sense to be objectively does not signify other than to be in the intellect in the way in which objects are accustomed to be in it" (2:74–5; AT 7:102). He illustrates this somewhat unhelpful explication as follows:

Thus, for example, if someone asks what happens to the sun from its being objectively in my intellect, it should best be responded that nothing happens to it except an extrinsic denomination, namely, that it terminates an operation of the intellect through the mode of an object. If, however, concerning the idea of the sun, it is asked what it is, it should be answered that it is the thing thought inasmuch as it is objectively in the intellect, for no one understands that to be the sun itself inasmuch as that denomination is in it extrinsically, nor will being objectively in the intellect signify that it [the sun] terminates an operation through the mode of an object, but to be in the intellect in that way in which objects are accustomed to be. Thus, *the idea of the sun is the sun itself existing in the intellect* not indeed formally as it does in the heavens but objectively, that is, in the way in which objects are accustomed to be in the intellect. (Trans. alt. 2:74–5; AT 7:102; emphasis added)

The language in this passage places more emphasis on the terminology of "objective being" (*objective esse in intellectu*) rather than that of "objective reality." Descartes's

response is that the idea of the sun is neither the sun as it exists in the heavens nor a *fictum*, an imaginary being or mere conceptual entity, but *the sun itself in the mode of being conceived*, and a thing's *being conceived* is, he insists, *being (esse)*. What has being must have a cause. Consider the idea of a machine with a very intricate design. The question, he argues, is not how the mind causes its own operations but how it comes to think about that *thing*, a machine with a highly intricate structure, whether actual or not, and that fact has to have an adequate cause, either a real machine from which it was copied, knowledge of mechanics, or human ingenuity (2:75; AT 7:103–4). The explanation cannot be that ideas arise from nothing, from some defect or imperfection in our nature, any more than the explanation of why someone has an idea of an intricate machine could be a lack of expertise in mechanics (2:75–6; AT 7:104–5; 2:96–7; AT 7:134–5). (Similarly, even if real essences and eternal truths did not themselves require a cause – which Descartes denies – some account of how the ideas of them exist in our minds is required.) All this strongly suggests a commitment to the two-modes-of-being reading.

Descartes's use of the terminology of objective being rather than objective reality is not confined to the exchange with Caterus. The third definition of the geometrical exposition of the Second Replies defines the objective reality of an idea as "the being of the thing (*entitatem rei*) represented by the idea, insofar as this is in the idea" (2:113; AT 7:161). Since there is, in general, no distinction between the *being* of a thing and the thing itself, for Descartes, this strongly suggests that the objective reality of an idea is the thing represented and not merely a measure of the degree of reality of the thing represented. Since Descartes also holds that to be conceived a thing need not actually exist, this suggests a further commitment to the being of possibles. This inference is congruent with the argument in the Fifth Meditation that because clear and distinct ideas represent real essences, the possible existence of what is represented is guaranteed (2:83; AT 7:116). If we have a clear and distinct idea of a triangle and its geometrical properties, we are thinking of some thing, the nature of triangles, even if no triangles actually exist (2:44–5; AT 7:64–5). All this suggests that to think of a thing that does not actually exist but is possible is to have its essence in mind, and essences have being whether instantiated or not (see also 3:280–1; AT 7:350).

It is important to see what is going on here. By defending the notion of objective reality as having ontological import, Descartes is stepping into a debate over the status of possibles that began in the fourteenth century. The Scotists held and the Thomists denied that possible objects had being. Talk of merely possible natures for a Thomist signaled nothing more than ways God could be imitated in nature, and so signaled no being in and of themselves. Although, for the Scotists, God's will is required for something to become actual, God's conceiving of it determines that it has some mode of being (*Ordinatio* I, Dist 36). We could easily read Caterus as siding with the Thomists and Descartes with the Scotists on this issue. A clear and distinct idea, for Descartes, represents some thing, the object of that idea and the product of God's intellect and will, since intellect and will are not distinct (2:45; AT 7:64). There is no escaping this direct link to reality so long as we think. Objective reality belongs to ideas "by their nature" (2:29; AT 7:42) and signals some kind of being, even if "much less perfect" than that which actually exists (2:28–9; AT 7:41–2; 2:113; AT 7:161).

The relationship between ideas and their objects is therefore an *intrinsic* one with all the mind-boggling metaphysical conclusions that entails. The idea of the sun is the sun itself existing in the intellect in some mode of being different from the one it has in the heavens. Why is this interpretation so hard to accept? Well, how could an idea be identical, on the one hand, with a mode of mind, *and* identical, on the other hand, with an external object, like the sun? Michael Ayers has argued that what Descartes must mean by “objective being” is something like the modern notion of an intentional object, an object that is not identical with any worldly object but that stands in for such an object in the mind. Ayers asks:

Which is the mere distinction of reason, and which the real distinction: (1) the distinction between the idea as mode of thought and the idea as intentional object of thought or (2) the distinction between the latter (i.e., the thing as it exists in the mind) and the real object (the thing as it exists in reality)? It seems clear that, at least on ordinary realist assumptions, there cannot be one thing, the idea, which is really identical *both* to the mode of thought *and* to the real object. (Ayers 1998: 1067)

Ayers reads Descartes as placing the real distinction between the intentional and the real object, committing himself in the process to a form of representational realism (the view according to which the mind does not cognize external objects directly but only through a veil of objective/intentional entities), from which it follows, unfortunately for Descartes’s epistemological project, “that I cannot think (immediately) about the real sun (or real God!)” (Ayers 1998: 1068).

We shall return to Ayers’s challenge later. Suffice it to say here that Descartes would not be impressed with the direction in which Ayers is leading him. Ideas, he tells us, should not be called “conceptual entities” if one means by this things that have conceptual but not real being. Such terminology is appropriate only if one means to refer to ideas as operations of the intellect, which is different from referring to them in relation to their objects (2:96–7; AT 7:134). The modern notion of an intentional object does not, moreover, discriminate between possible and impossible natures, whereas, for Descartes, the objects of our basic stock of ideas can *only* be drawn from what is or could be really instantiated. That there are such constraints is most clearly demonstrated in the discussion of material falsity, to which we should now, at last, turn.

Material Falsity and Its Problems

As a preliminary to the argument for God’s existence in the Third Meditation, Descartes turns to examine whether any of his ideas have so much objective reality that they could not possibly come from him alone and which might, therefore, be used to establish the existence of things outside him. Few ideas of corporeal things stand out as being clear and distinct and none contain objectively a degree of reality so great that they could not have originated from within his mind alone (2:30; AT 7:43). The worst offenders in this category are those ideas of sensible qualities each of us thinks about only in a very confused and obscure manner – ideas of light and colors, sounds, smells, tastes, heat and cold, and the other tactile qualities. Of these Descartes writes: “I am

ignorant whether they are true or false, that is, whether the ideas I have of them are ideas of certain things or not of things" (trans. alt. 2:30; AT 7:43). Descartes then distinguishes between the truth or falsity ideas possess, "material" truth or falsity, and the "formal" truth or falsity that pertains to judgment. Candidates for material falsity are the ideas of heat and cold. These ideas are so confused and obscure that we cannot tell whether cold is merely the absence of a thing or reality, or heat is, or whether both are real qualities or neither is (2:29–30; AT 7:43–4). The Fourth Replies adds to these candidates the ideas of color, "if it is true, as I have said, that these ideas do not exhibit anything real" (trans. alt. 2:163; AT 7:234).

In order to come to grips with the notion of material falsity we need to consider what work it does that could not be done by the ordinary notion of formal falsity. The notion of material falsity is intended to explain why we are prone to certain kinds of errors of judgment. It is because all ideas are "as if of things," present things in a positive mode of being, that a materially false idea is prior to and inclines us to false judgment.

Since there can be no ideas which are not as it were of things (*nisi tanquam rerum*), if it is true that cold is nothing but the absence of heat, the idea which represents it to me as something real and positive deserves to be called false; and the same goes for other ideas of this kind. (2:30; AT 7:44)

An idea is only materially false if it provides material for false judgment in this way (2:163; AT 7:233). Descartes asserts that although any idea that provides material for false judgment could be called materially false, the term is appropriate only when the scope for error is great. Confused ideas that are consciously constructed at will, such as those of a chimera or false God, typically provide little scope for error, whereas ideas from the senses, particularly those relating to appetite, provide the greatest scope for error and most deserve being called materially false (2:163–4; AT 7:233–4). This suggests (although Descartes does not explicitly say so) that without undergoing any intrinsic change, an idea may cease to be materially false if, through an increased understanding of its origins, it ceases to dispose one to false judgment. Things may still appear a certain way, just as a half-submerged stick will always appear bent according to the law of refraction, but unless we remain in the grip of childish habits, we will not be disposed to trust our senses (2:295–6; AT 7:438–9).

Sensory ideas may be prime candidates for material falsity, but they play a crucial epistemic role in our knowing that a material world exists. Sensations are sure signs from a benevolent God of our place in a material world. Since God is no deceiver and such ideas appear to come from bodies, Descartes concludes that it must be bodies themselves that are the formal cause of "everything which is found objectively in the ideas of them" (2:55; AT 7:79–80). But he denies that it is either bodies or God that are the cause of materially false ideas. Instead, it is true by the natural light that any materially false idea "arises from nothing," that it is in me only because of a deficiency and lack of perfection in my nature (2:30; AT 7:44).

Neither of these two marks of materially false ideas – that they represent non-things as things and that they arise from nothing – sit well with Descartes's general account of ideas. In the Fourth Objections, Antoine Arnauld presents two dilemmas, both of which are designed to show that there cannot be an idea in Descartes's technical sense

that is materially false. Let us call the first the *dilemma of objective non-existence*, and the second, the *dilemma of uncaused ideas*.

Arnauld begins by asking whether, if cold is a privation, there could be an idea that was both *of cold* and false:

What is the idea of cold? It is coldness itself insofar as it exists objectively in the intellect. But if cold is an absence, it cannot exist objectively in the intellect by means of an idea whose objective existence is a positive entity. Therefore, if cold is merely an absence, there cannot ever be a positive idea of it, and hence there cannot be an idea which is materially false. (2:206; AT 7:206)

Formulating this as a dilemma we get:

The Dilemma of Objective Non-Existence:

Either the idea of cold is cold existing objectively "as it does in the intellect" or it is not. If it is cold existing objectively, then cold is something positive and the idea is not materially false. If cold does not exist objectively, then it is not the idea of cold, but rather (if it is an idea) an idea of something else. In neither case do we have a materially false idea of cold.

Arnauld recommends abandoning the notion of material falsity. There are other ways to explain how our sensory ideas make us prone to errors of judgment about the natural world. We can admit that all ideas are true and positive while denying that they are always the ideas they seem to be. Perhaps what we think is the idea of cold is really the idea of something else, in which case the falsity resides in a (formally false) judgment about the true object of the idea. The idea of cold would not then itself be false anymore than the idea of God is false simply because it is applied by idolaters to things other than God (2:145; AT 7:207). But the idea of God is the idea it is because of God's objective presence in the mind. Arnauld does not say what thing objectively existing in the mind would make the idea of cold true and positive if cold is a privation, which suggests that there is more going on in such examples than is going on in the misattribution of an otherwise true idea like the idea of God.

Arnauld's second objection is contained in the following passage:

And besides what is the cause of that positive objective being whence comes the force so that that idea may be materially false? "I am," you say, inasmuch as I am from nothing. Then the positive objective being of some idea is able to be from nothing, which particularly contradicts the fundamental principles of this celebrated man. (Trans. alt. 2:146; AT 7:207)

Thus we have:

The Dilemma of Uncaused Ideas:

Either the objective reality of the idea of cold is caused by something or by nothing. If it is caused by something, its cause is either a privation, in which case the idea is true, or its cause is some other positive being, in which case the idea is not the idea of cold but it is also neither false nor uncaused. If the objective reality of the idea of cold comes from nothing, the causal principles used to establish the existence of God are violated.

The second horn of this dilemma is clearly one Descartes needs to avoid. If the objective reality of any idea could come from nothing, why couldn't the objective reality of the idea of God also come from nothing? What about the first horn? Could Descartes accept that the objective reality of the idea of cold comes from something and still hold that the idea is materially false? Arnauld seems to think not. If the idea of cold comes from a privation, then privations, it would seem, can be causes and if they can be causes then surely they can be objects of true ideas. By the same reasoning, if something other than a privation is the cause/object of the idea, the idea of cold is the idea of it and so not false either. In neither case do we find a false idea consistent with Descartes's causal principle.

The root of both of Arnauld's dilemmas is the conflict between Descartes's objective existence theory of ideas and the notion of material falsity. The former seems to entail that for an idea to be of *x*, *x* must have (objective) being, whereas the latter demands that if an idea of *x* is false, *x* has no being whatsoever. If we could say that cold has mere intentional being, then we could both talk *about* cold and deny the possibility of its existence. But it should be clear that this is not an option of which Descartes can avail himself. Why then doesn't he accept Arnauld's eminently sensible advice that the error resides in what we judge to be the objects of our ideas?

One influential reading, advanced by Margaret Wilson (1978), has it that Descartes eventually abandoned the notion of material falsity. Another reading tries to reconcile the doctrine of objective reality with the notion of material falsity. Let us compare these two readings.

Reading 1: Descartes Abandons Material Falsity

In light of the above difficulties, a question arises as to whether Descartes in the end took his theory of error to in any way depend on the notion of material falsity. Wilson doubts that he did and thinks he came to have such doubts himself after the *Replies*, retreating from the notion or at least downplaying its importance. In both the *Meditations* and the reply to Arnauld, material falsity is linked to the confused and obscure quality of sensory ideas. But if the problem with such ideas is that they represent their objects with such confusion and obscurity that we can't tell what their objects are, why, Wilson asks, isn't the confusion and obscurity present in such ideas enough to warrant Descartes's withdrawal from the senses (Wilson 1978: 115–16)?

It is true, as Wilson notes, that the notion of material falsity does not appear in later texts such as the *Principles of Philosophy*, and although Descartes refers to the same list of dubious sensory ideas at *Principles* I, 70, as ideas which “do not represent anything located outside our thought,” this is compatible with Arnauld's suggestion that all ideas are true and positive, but not necessarily the ideas we take them to be (1:218; AT 8A:35). While the discussion of sensory ideas around *Principles* I, 66–71 maintains the position that colors, light, etc., cannot be known to exist just because we have sensory ideas of them, any more than pain could be said to exist in a foot simply because we feel it “as it were in our foot,” the error in question is a matter of our *judging* qualities to be there which are not (1:217; AT 8A:33). Moreover, these errors are linked to the

fact that such ideas are confused and obscure, and occur because of the utility to the developing human organism of differentiating objects in ways corresponding to the variety of ways it is affected by them (*Principles* I, 71; 1:218–19; AT 8A:35–6). Colors and pains are only clearly and distinctly perceived when they are regarded as sensations or thoughts (1:217; AT 8A:33). Errors arise from thinking that colors, light, pain, and so on, are present in bodies, a move which is warranted only in the case of our sensory ideas of size, shape, motion, and number, on account of the fact that these things are clearly and independently perceived to be “actually or possibly” present in objects (1:217–18; AT 8A:34–5).

What is, in particular, absent from the discussion of sensory error in the *Principles* is the suggestion that ideas are false when they represent non-things as things. This is not to say that the notion of material falsity is incompatible with the discussion here. So far Descartes is only guilty of the sin of omission. And there is reason to think that however much he embellishes the developmental account of how it seems “natural” to us to judge mistakenly that all our sensory ideas resemble real qualities of bodies, what makes us prone to such false judgments has to do ultimately with the way sensory ideas present their objects to the mind. It is, after all, because we feel pain “as it were in our foot” that we judge the pain to be there and not in our minds. Something stronger than confusion and obscurity about the “something we know not what” (1:218; AT 8A:34) that is really out there is required to make sense of the precise cognitive and behavioral roles such ideas have. We are not confused that the pain appears as it were in the foot (as opposed to the head or chest). And although we have yet to see what exact form the confusion and obscurity of such ideas takes, the discussion of sensory error in the *Principles* is considerably weakened if we cannot suppose that in the background there is the more exact formulation of the kind of misrepresentation the original account of material falsity was intended to provide.

Later texts also suggest that the notion was still firmly part of Descartes’s anti-empiricist project. When in 1648 Franz Burman objects to Descartes’s treatment of false ideas on the grounds that errors only arise when ideas are incorrectly “referred” in judgments to external things, Descartes, according to Burman’s report, responds in the following manner:

Even if I refer them [sensory ideas] to no things outside myself, there is nonetheless occasion for error, since I am able to err in regard to the very nature of them, as when I consider the idea of colour and say it to be a thing, quality or, more appropriately, colour itself, which is represented through that idea. For example, if I were to say that whiteness is a quality, and even if I referred that idea to no thing outside myself and do not say or suppose any thing to be white, I would be able, however, in the abstract and in the very nature or idea of whiteness itself to err. (Trans. alt. 3:337; AT 5:152)

These errors “in the abstract” hint at the notion of material falsity. They point to a deeper kind of error than those that arise merely through misapplying or “misreferring” an idea to a subject in a judgment. The passage suggests, first, that what is at issue is the status of colors, cold, heat, etc., as things, real qualities or modes of body, and, second, that Descartes’s early definition of materially false ideas “representing non-things as things” was still very much before his mind towards the end of his life.

If Descartes thought that the notion of material falsity was consistent with his general theory of ideas, it must have been because he thought that there was some way of reconciling the two. This is what we do in fact find according to a reading which treats the notion of material falsity as a central part of the Cartesian project.

Reading 2: Reconciling Material Falsity and Objective Reality

Descartes's response to the first dilemma is encapsulated in the following passage from the Fourth Replies:

When, however, he [Arnauld] says that the idea of cold is coldness itself as it is objectively in the intellect I think that a distinction is necessary: for it often happens in confused and obscure ideas, among which those of heat and cold are numbered, that they are referred to a thing other than that of which they are ideas. Thus, if cold is only a privation, the idea of cold is not cold itself, as it were objectively in the intellect, but another thing which I take wrongly for that privation; truly, it is the sensation itself which has no being outside the intellect. (Trans. alt. 2:163; AT 7:233)

Materially false ideas, like all ideas, have objective reality, but it does not follow that either privations or non-things have objective being. In the case of the idea of cold it is only "the sensation itself" which inheres objectively in the intellect. The falsity of such ideas rests with their being "referred" to something other than that of which they are ideas. All this needs disentangling because, *prima facie*, Descartes's reply is unsatisfactory. If a sensation is what is represented in the idea of cold, what entitles us to think of the idea as false? Sensations are real and positive modes of mind, and any idea that represents something real as other than it is, is not thereby representing a non-thing as a thing. What, moreover, is it to "refer" an idea? If referring is predicating an idea of some thing in a judgment, why isn't Arnauld right in claiming that the only falsity that arises resides in judgment and not in ideas themselves?

To begin disentangling these remarks, we need to back up a bit. Earlier in his reply to Arnauld, Descartes makes a confusing distinction between "idea" taken in the "formal" sense, as representing this or that, and "idea" taken "materially," as simply an operation of the intellect – confusing because this use of "formal" and "material" does not track the distinction between formal and material truth and falsity (2:162–3; AT 7:232). What plays the role of matter in the mind are the mind's operations or acts, and in this sense of "material" truth or falsity is not at issue. But when Arnauld denies that there can be an idea of a privation that represents it as a positive thing, we are told that he is thinking of ideas in the *formal* sense, as representing this or that, by analogy with the intentional forms of Scholastic psychology. In this sense, moreover, Arnauld is right in thinking that all ideas are true and positive because "whether cold is a positive thing or an absence does not affect the idea I have of it" (2:163; AT 7:231–2). This is an important concession because it means that the idea of cold is the idea it is independently of whether cold is a real quality or privation. Later we learn that it is the idea it is because of the particular kind of sensation involved. The identity conditions for the idea of cold are, in other words, wholly internal, and from this

internal perspective the idea is true to its form. If Arnauld is right in taking sensory ideas in this formal way, however, what exactly is the mistake being made in a materially false idea?

One answer to this last question is that when Descartes talks about “referring” the idea of cold to something other than that of which it is an idea, what he is invoking is a kind of categorical error. If cold is a privation, the only object present to mind through the idea is a sensation, but we confuse that which is really a mode of mind with a mode of body and so predicate the idea of bodies rather than the mind (see Field 1993). This interpretation has a fair amount of intuitive appeal. It is congruent with Descartes’s general view that confusing functions or modes of the soul for those of the body is the root of all bad philosophy regarding the nature and functions of the soul (1:314; AT 11:223–5; 1:329; AT 11:330). And it agrees with the phenomenology of sensory ideas. When I feel cold from touching the ice, I am inclined to think that I am feeling something genuinely in the ice, not in my mind. This is no ordinary kind of error but a matter of mistaking one ontological category (mental) for another (physical). Feeling cold in the ice is not like mistaking a cow on a dark night for a horse, but a sign of a deep confusion about what kind of being is represented in one’s idea.

How well does this interpretation sit with other aspects of Descartes’s theory of sensory ideas? Descartes’s claim from the Sixth Meditation that bodies themselves must be the formal cause of everything objectively present in ideas is difficult to reconcile with this analysis of material falsity. Materially true and false sensory ideas alike are caused by the impact of bodies on our sense organs, but bodies cannot formally contain sensations, and so cannot be the formal cause of sensations inhering objectively in the intellect. Second, Descartes’s usual approach to sensory ideas is not that they represent sensations but that they represent, albeit in a confused and obscure way, bodies or their modes. Indeed, such ideas more often than not “report the truth” insofar as they track differences between bodies according to how they affect us differently (2:69; AT 7:89). Hence, from the fact that we perceive through our senses a “great variety of colours, sounds, smells and tastes, as well as differences in heat, hardness and the like,” we are correct in inferring that bodies “possess differences corresponding to such perceptions, though perhaps not resembling them” (2:56; AT 7:81). But how can sensory ideas report truths about bodies if such differences are not objectively present in the ideas? Finally, and again, the error seems to reside in a judgment about the object of the idea rather than the idea itself.

Perhaps what is needed to resolve these difficulties is a closer look at the notion of referring. If the notion means no more than predicating an idea of some thing in a judgment, it looks ill-equipped to meet Arnauld’s objection. But, interestingly, the notion is not always used this way. In *The Passions of the Soul*, it is introduced to differentiate among sensations and passions at the level of how things seem, rather than at how we judge them to be.

All the perceptions which I have not yet explained come to the soul through the mediation of the nerves. They differ from one another insofar as we refer some to external objects which strike our senses, others to our body or to certain of its parts, and still others to our soul. (1:337; AT 11:345)

How an idea is referred is part of the definition of a sensation or passion (*Passions*, article 27; 2:338; AT 11:349), and is connected with how they represent.

Thus, when we see the light of a torch and hear the sound of a bell, the sound and the light are two different actions, which, simply by producing two different movements in some of our nerves, and, through them in our brain, give to the soul two different sensations. And we refer these sensations to the subjects we suppose to be their causes in such a way that we think we see the torch itself and hear the bell, and not that we have sensory perception merely of the movements coming from these objects. (1:337; AT 11:346)

Hearing a sound as being “of the bell” is the same as referring it to the bell. When I refer cold to the ice, it seems as if what is present to mind is really in the ice no less than is its shape, which I also refer to the ice, but all that is objectively present in the first idea is a feeling, whereas a shape is objectively present in the second. In each case it seems as if a sensible quality of a particular body is being perceived, on the basis of which I may be led to the (formally) false judgment that both cold and shape are qualities of the ice. The work the notion of material falsity does is to explain how appearances can be false and provide, thereby, material for false judgment. But what is the structure of the prejudgmental act that presents the appearances of things thus and so?

The above passages from the *Passions* suggest the following formulation of what it is to refer a perception to a thing:

To refer A to B is to perceive (or experience) A as a mode of B.

This formulation makes referring part of the sensory experience rather than a subsequent judgment. To refer the feeling of cold to the ice is to feel cold as being in the ice. To refer a pain to the foot is to feel the pain as being in the foot. In each case the objective content of the idea is experienced as if it were a mode of body. But since sensations have real being, this formulation may seem to advance little Descartes’s claim that some of these ideas represent non-things as things. Notice, however, that it is possible to formulate the referring function so that it is a mode of body that is being represented as a thing.

To refer A to B is to perceive (or experience) B as modified by A.

This formulation is extensionally equivalent to (1). To experience A as a mode of B just is for B to appear modified by A. To refer pain to the foot, on this formulation, is to experience the foot as being in pain. To refer cold to the ice is to feel the ice as being cold.

This second formulation of the referring function brings out clearly the way in which, with the exception of passions, sensory ideas are not primarily self-representing (though secondarily they are). Primarily, they represent bodies as modified in certain ways. Both formulations suggest, however, that referring is a matter of *compounding* one idea, in this case a sensation, with another idea, an idea of a particular material substance, which, through (a possibly habitual) causal association, is confused as being

the proper subject of the mode. Because I typically have a sensation of cold when in contact with ice, a natural compounding or *con-fusing* (fusing together) of the ideas of cold and ice occurs habitually within my mind and the complex as a whole represents a non-thing as a thing just as the willful compounding of two true ideas into an idea of a winged horse represents a non-thing (no true and immutable nature) as a thing (2:83; AT 7:117–18). We might call this compounding of ideas a judgment of sorts, since it occurs within the intellect and it is up to the intellect to separate out the components if it is to obtain clarity and distinctness, but if this compounding is a judgment, it is logically prior to the kind of judgment we make in *assenting* to propositions such as “this ice (really) is cold” or “there exist winged horses” (2:294–6; AT 7:437–9; cf. Nelson 1996: 24–5).

The examples of referring sensory ideas hint at a kind of ambiguity that can be detected in our ordinary use of sensory predicates. We say that sand feels gritty. Is this to say that we experience a gritty feeling or that the sand has a gritty quality, or both? We talk both of painful episodes and pains in the feet, of colorful sights and colorful landscapes, switching back and forth between descriptions of our experiences and descriptions of material objects. If anything, it seems more appropriate generally to treat such predicates as describing material objects – as if, alternatively, one’s auditory experience could be loud rather than the noise of the stereo or one’s vision glaring rather than the reflection off the pool. Could Descartes have been trying to articulate something like these common ambiguities in our sensory experience? If so, we have an ingenious solution to the problem of material falsity. On the second formulation of the referring function, (2), a sensory idea compounded with an idea of a particular body produces a complex idea characterizing a body as modified in the way presented in the sensory component. When there is nothing in a body that is formally of the type objectively present in the sensory idea, then the complex will effectively represent a non-thing (like cold or a color) as a thing. When there is a mode of body of the same type objectively present in the idea, like shape, no categorical error is involved in the complex (which is not to say the sensory idea represents the shape accurately). And we might even speculate that to err “in the abstract” about sensory ideas is to habitually compound them with a universal, an abstract idea of body in general, in such a way that the complex ideas formed present sensory qualities as ones that *could* modify bodies.

Understanding “referring” in this way has broad implications for the coherence of the notion of material falsity. Recall our earlier concern about how sensory ideas can “report truths” about bodies if the reported differences between bodies are not objectively reflected in our ideas. If such differences were formally in bodies and objectively present in sensory ideas, we could explain Descartes’s assertion that bodies are the formal cause of everything contained objectively in our sensory ideas. The above account of the referring function offers, however, an alternative way of linking sensory ideas to facts about bodies besides objective unification. At *Principles* I, 69, Descartes asserts that our cognitive grasp of the differences between bodies relating to color, smell, taste, etc., unlike our clear grasp of quantitative modes, “must be referred to the senses” and not explained by reference to bodies alone (1:217; AT 8A:33). One way to interpret this is as saying that our knowledge of bodies through the former qualitative ideas is not direct, unlike quantitative ideas of bodies that do involve an objective

unification of mind and world. Descartes's claim in the Sixth Meditation that we are entitled to *infer* from sensory ideas that there are genuine differences between bodies does not depend on those differences being objectively present. Compare how we infer from a change in the images on a television screen – from, say, a banana to a fish – to a difference between the electric signals being transmitted without that difference being represented in the images. (Although we judged more to be going on, we really *saw* nothing more than a banana and a fish.) Similarly, we are just as warranted in inferring that bodies exist from our color perceptions as from our perceptions of motion or shape, but it doesn't follow that the representational and inferential process is the same in each case (1:217; AT 8A:34). The former is based on an inference from the regular association and compounding of ideas of sensations with ideas of bodies, whereas the latter is based on the objective unification of ideas and genuine modes of body.

But given all this how can bodies be the *formal* cause of everything objectively present in our sensory ideas, that is a cause which has formally the qualities produced in the effect, when bodies cannot be modified by sensations (2:114; AT 7:161)? This is extremely puzzling, but the above interpretation enables us to reduce its force somewhat. The context in which this claim is asserted is one in which Descartes is concerned with establishing how sensory ideas ground the inference that bodies exist. We now know that this inference can be supported directly when our sensory ideas represent “all the properties which I clearly and distinctly understand, that is, all those which, viewed in general terms, are comprised within the subject matter of pure mathematics” or, if the ideas are confused and obscure, in the indirect way described above (2:55; AT 7:80). Bodies should be understood only as the formal cause of those objective features of sensory ideas that directly support this inference. Bodies should not be regarded as the formal cause of what is objectively present in materially false ideas that “arise from nothing” – i.e., when they are false because of what their cause formally *lacks* rather than possesses. We shall explain what this means further in the next section, but observe here that materially false sensory ideas must stand as an exception to the above rule. If what we call cold in bodies is a privation or non-thing, and a sensation is instead objectively present in the idea, it can only be the mind that (involuntarily) gives form to the idea on the occasion of certain sorts of motions occurring in the nervous system (see 1:304; AT 8B:358–9).

If cold is a privation, when the idea of cold represents bodies as modified in a positive way, the idea will be materially false but not, on that account, harmful to the union. Nor will it be uninformative. The falsity of such ideas renders them unfit for incorporation in the physics, but necessary for everyday life and our understanding of our place in the material world.

Response to the Dilemma of Uncaused Ideas

Although it is generally regarded as a devastating criticism, Arnauld's second objection is relatively easy to defuse. This is because it is founded on an assumption Descartes does not share: that the objective reality of materially false ideas must lack a cause. In the Third Meditation, recall, Descartes asserts that “if [these ideas] are false, that is represent non-things, I know by the natural light that they arise from nothing” (2:30;

AT 7:44). What is it that arises from nothing here? The passage does not make it explicit, and so, understandably, Arnauld is led to assume that it is the *idea-cum-its-objective-reality* that lacks a cause. But even in this passage, whatever it is that arises from nothing is tied to the falsity of the idea, and in the Fourth Replies, Descartes offers the following clarification of what he means:

I do not claim that [an idea] is made *materially false* from some positive being but from the obscurity alone which however has some positive being for its subject, namely the very sensation [*sensum*] itself. And indeed that positive being is in me inasmuch as I am a true thing [*res vera*]. The very obscurity which alone gives me occasion for judging that that idea, the sensation of cold, represents some object posited outside me which is called “cold” does not have a real cause but only arises thence that my nature is not perfect in all its parts. (Trans. alt. 2:164; AT 7:234–5; emphasis added)

Why should it make a difference to Arnauld’s objection that an idea, considered in terms of its being materially false, should arise from nothing? Aren’t we still getting something from nothing? Notice that in this passage what is said to arise from nothing is not the objective reality of the idea but its material falsity. The latter is grounded in the obscurity of the idea, but that does not mean that it is caused, for obscurity arises from nothing but a defect or imperfection in my nature. If I were God, I would not have such ideas. But *my not being God* is not a thing and so not a cause either. No doubt there are good theological reasons for Descartes to deny that falsity (like evil) is caused, but there is an interesting semantic/metaphysical point being made here besides. Although an idea’s representing something “real and positive” stands in need of a causal explanation, misrepresentation or falsity *per se* does not, and that, as a general observation, seems right. If I parade myself around as the Queen of France, my self-presentation is false, we say, “because” (currently) there is no Queen of France, but *there being no Queen of France* is not a thing and so cannot be a cause.

The above reply suggests that the obscurity of the idea has some subject, even though the obscurity is not caused. We can explain how a sensation of cold is produced by the motions of particles impinging on the sensory receptors and the flow of animal spirits through the nerves, but the nature of this causal process and the union of mind and body are obscured in the process. All that is present to mind, all that is “perceived as being in the object of our idea” is the sensation itself (2:114–15; AT 7:161). Taking the idea of cold formally (as the sensation inhering in the intellect) it is true and positive, and has a cause. But the idea is also habitually referred to bodies and in virtue of that is false. It is this aspect of the idea that is due to our imperfection.

The Identity of Ideas

It is Descartes’s strong commitment to an objective existence theory of ideas that generates all the puzzles of material falsity and it is, according to some, a commitment wholly unjustified. Recall Ayers’s objection that an idea cannot be both identical to a mode of mind and to an extramental object and his claim that the only reasonable solution is to deny any strict identity between the thing objectively existing in mind

and its really existing counterpart. Ayers's reading denies the objective unification of mind and world I have been claiming is central to Descartes's theory of ideas and epistemology. Is there any way to save this aspect of Descartes's view from the absurdity to which Ayers draws our attention?

Here is one solution to Ayers's puzzle. Take the term "idea" to denote a whole composed of two essential metaphysical parts: a mode of mind and an object, for example, the sun. As a whole cannot exist apart from its parts, so too an idea cannot exist apart from the mode of mind and the object that defines it as the very idea it is. Thus the idea of the sun is *not* really distinct from either the mode of mind or the sun itself. None of this entails, however, that a mode of mind is identical with the sun. While a whole cannot exist without all its parts, its parts can exist apart from each other.

When we say that the idea of the sun is not really distinct from the sun itself, we mean the real sun, actual or possible. When the sun exists in a relation to thought, it has objective being, and its existing in this relation demands an explanation, even if it is unaffected in itself by being conceived. This reading is perfectly congruent with "ordinary realist assumptions." The sun could exist even if no one thought about it and the idea is an idea of the sun, not a proxy, intentional or ideal sun. I would also say (though it makes some of my close friends squirm) that the very same (token) mode of mind that is part of my present idea of the sun could also exist, at least by an act of God, without the sun, but in that case it would not be the idea of the sun. The fact that all ideas have the same *degree* of formal reality does not rule out formal differences between them, and thus a mode of mind might be identifiable by its formal features independently of its objective reality *qua* idea. Perhaps it is by the formal feature of a mode of mind of which we are aware that we identify it as a feeling of sadness, one that happens to be caused by thick and sluggish blood, "although the mind itself may perhaps not know of any reason why it should be sad" (1:281; AT 8A:317). In general, it seems that the mode of mind has to contribute something of its own to the ideational mix, lest there be nothing to an idea but its object (which seems contrary to Descartes's view). But even if that very mode of mind which constitutes part of the idea of the sun could only be preserved by God as a constituent of some other idea together with some other object in order to be identifiable at all, that is consistent with its being really distinct from the sun.

What happens to materially false ideas on this picture? Unlike the idea of the sun, the idea of cold consists of no objective unification of mind and world but the subjective and objective existence of one and the same thing, "the sensation itself." There were precedents for this move – Eustachius a Sancto Paulo (whose textbook Descartes admired) used the simultaneous subjective and objective existence of ideas to account for self-awareness (*Summa philosophiae quadripartita* 4. 1. d. I. q. 2). Nicolas Malebranche, on the other side, would take the collapse of objective and subjective being as sufficient reason for demoting sensations from the category of ideas (*The Search After Truth* Book III, Part 2). But in Descartes's framework, this collapse is precisely what we should expect. Sensory ideas of cold, color, pain, etc., are linked to the world not through objective unification but through our habitually con-fusing them with ideas of body. It is their cognitive role rather than their objective reality which explains why we think they are really ideas of body, why they are useful for us in tracking relational differences between bodies, and why they are, therefore, more likely to be false than true.

Sensory ideas are clearly perceived when and only when they are considered as affections of the mind, and, presumably, this ability for clarity, like our general ability for clarity, just is the ability to distinguish them by their objects, the sensations they involve. But insofar as we “refer” them to external things, our attention is directed outside the mind to things that are important for us as embodied beings. These two facets of sensory ideas, internal and external, complement one another. For in describing the quality of our sensations (and in teaching our children to do likewise) we slide easily into describing the things around us that give rise to our sensations. The gritty feeling of sand becomes the grittiness of the sand; the painful feeling becomes the pain in the foot; the cold feeling the coldness in the ice. We tend to externalize the content of all our sensory ideas, barring those passions we refer to the soul itself, and this inclination is at the same time both a very natural and useful inclination for beings like us, and the root of our most pernicious errors of judgment about the natural world.

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Chapter 13

Clear and Distinct Perception

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Clear and distinct perception occupies a central place in Descartes's philosophy. His most famous work, the *Meditations*, is designed to teach his readers how to perceive clearly and distinctly. He wrote to Mersenne that "we have to form distinct ideas of the things we want to judge about, and this is what most people fail to do and what I have mainly tried to teach by my *Meditations*" (3:165; AT 3:272). We learn in the Fourth Meditation that everything we clearly and distinctly perceive is true: "if, whenever I have to make a judgment, I restrain my will so that it extends to what the intellect clearly and distinctly reveals, and no further, then it is quite impossible for me to go wrong" (2:43; AT 7:62). We are assured of this by our knowledge that we are created by a perfect God; since our clear and distinct perceptions are real things, they must come from God, and so cannot be false (1:130; AT 6:38, 2:43; AT 7:62, 1:203; AT 8A:16).

Descartes's appeal to God's perfection to guarantee the truth of clear and distinct perceptions gives rise to a familiar charge of circularity. But there is another familiar charge brought against Descartes's appeal to clarity and distinctness as a criterion of truth: that he does not provide an adequate criterion of clarity and distinctness. This charge was famously made by Leibniz, who demanded a criterion for clarity and distinctness that was "palpable" and "mechanical" (cited by Gewirth 1943). It was put to Descartes himself by Gassendi in his objections to the *Meditations*: "please note, distinguished Sir, that the difficulty does not seem to be about whether we must clearly and distinctly understand something if we are to avoid error, but about what possible skill or method will permit us to discover that our understanding is so clear and distinct as to be true and to make it impossible that we should be mistaken" (2:221; AT 7:318; see also 2:194–5; AT 7:279). Though the notion of clear and distinct perception appears in the *Rules*, the *Discourse*, and the *Meditations*, no explicit definition of it is given in any of those works. Descartes does offer a definition in the *Principles of Philosophy*, where he states that a perception is clear when it is present and open to the attentive mind, and distinct when it is not only clear, but so sharply separated from other perceptions that it contains only what is clear (1:207–8; AT 8A:22). But without some elaboration of the crucial terms in the definition, it is hard to see how to use it to identify genuinely clear and distinct perceptions.

This chapter begins with a sketch of relevant aspects of the theory of ideas which provides the setting for Descartes's notion of clear and distinct perception. I briefly discuss some interpretations of that notion, then turn to Descartes's response to Gassendi. Since this stresses the importance of eliminating prejudice as a preparation for perceiving clearly and distinctly, I examine both the kind of prejudices that stand in the way of clear and distinct perception, and the route to such perception laid out in the first two Meditations. This suggests an account of clarity and distinctness which I discuss in relation to the definition offered in the *Principles*. I then raise some problems posed by Descartes's remarks concerning the clarity and distinctness and obscurity and confusion of sensory ideas. The concluding section returns to the role of clear and distinct ideas in Descartes's project, and to the question of whether he provides an adequate criterion of clarity and distinctness.

Ideas and Perceptions

Descartes's theory of clear and distinct perception is set within his theory of ideas. Ideas, modes of thinking, perceptions, intellectual operations, and knowledge (*notitia*) are all described on occasion as being clear and distinct. He also speaks of perceiving, understanding, thinking, and knowing clearly and distinctly. Descartes sometimes speaks of ideas as though they were objects of acts of perception: "all that the intellect does is to enable me to perceive the ideas which are subjects for possible judgments" (2:39; AT 7:56). But he also speaks of ideas as acts of perception themselves. Perception, defined as "the operation of the intellect," is one of the two general modes of thinking of which the mind is capable, the other being volition (1:204; AT 8A:17). But ideas are operations of the intellect (2:7; AT 7:8), so they are perceptions (Chappell 1986: 182). Kenny (1967) argues that Descartes uses "idea" equivocally, meaning by it sometimes an act of perception, sometimes the mental object of such an act, and that this has fatal consequences for his theory of clear and distinct perception. If both object and act can be clear and distinct or obscure and confused, incoherence results; we have to countenance such absurdities as an obscure perception of a clear idea, or a clear perception of an obscure idea (Kenny 1967: 248–9).

Kenny's objection presupposes that ideas as acts and ideas as objects can vary independently in their degree of clarity. But there is strong evidence that Descartes conceives of ideas in his "act" sense and ideas in his "objective" sense as more closely related than this would imply (Nadler 1989: 126–30). Descartes distinguishes two senses of the word "idea" in the Preface to the *Meditations*. He writes that "idea" can "be taken materially, as an operation of the intellect," or "it can be taken objectively, as the thing represented by that operation" (2:7; AT 7:8). Ideas in the objective sense are not described as the *objects* of the acts or perceptions which are ideas in the first sense, contrary to the reading given by Kenny (1967: 229). Rather, ideas taken objectively are the things *represented by* the acts or operations which are ideas taken materially. This entails that ideas as acts, i.e., as thoughts or perceptions, are themselves representational. This is not surprising, since for Descartes all thoughts are representational, in the sense that they are directed on objects. But how can ideas in the objective sense *be* the things represented by thoughts? This suggests that we only ever think

about ideas, which is indeed Kenny's interpretation of Descartes's view (Kenny 1967: 242). But we can avoid this interpretation if we attend to the model of thought Descartes employs here.

The word "objective" in this context imports the notion of an object of thought, the thing to which the thought is directed. Descartes speaks in the Third Meditation of "the mode of being by which a thing exists objectively in the intellect by way of an idea" (2:29; AT 7:41). The "thing" here is the object of thought, and hence the object of an idea in the material sense, which is an operation of the intellect or a perception. In the First Replies Descartes explains that an idea is "the thing which is thought of insofar as it has objective being in the intellect" (2:75; AT 7:102). The thing which is thought of existing objectively in the intellect is the thing represented by the thought. A thing x becomes an object of thought, something represented by an act of the intellect, when it exists objectively in the intellect by way of an idea. Where there is an idea taken materially, an act of thought representing or directed on some object x , there is an idea taken objectively, an object x to which the thought is directed. The idea of x taken materially as an act of thought directed on x is constituted by x existing objectively (as an object of thought) in the intellect. This is borne out by Descartes's example: "the *idea* of the sun is *the sun itself* existing in the intellect – not of course formally existing, as it does in the heavens, but objectively existing, i.e., in the way in which objects normally are in the intellect" (2:75; AT 7:102; emphasis added). So the idea of the sun taken materially is simply a thought of the sun, and the idea of the sun taken objectively is the thing represented by that thought, the sun, existing as an object of thought in the intellect. Arnauld describes the dual material and objective character of Cartesian ideas thus: "I take perception and idea to be one and the same. Nonetheless . . . this thing, although single, stands in two relations: one to the soul which it modifies, the other to the thing perceived . . . and the word 'perception' more directly indicates the first relation; the word 'idea', the latter relation" (Arnauld 1775: 198, quoted by Nadler 1989: 167).

As noted earlier, for Descartes all thoughts are directed on objects; in contemporary parlance, all thoughts are intentional. Since all modifications of a mind are thoughts, this means that all modifications of a mind are intentional. This is reflected in Descartes's classification of "all [his] thoughts" into kinds in the Third Meditation. He identifies two classes of thoughts: ideas "strictly speaking," and others such as emotions, volitions, and judgments which consist of ideas plus "additional forms" (2:25–6; AT 7:37). Ideas strictly speaking are thoughts of objects, "as when I think of a man, or a chimera, or the sky, or an angel, or God" (2:25; AT 7:37). All thoughts of the other class include ideas strictly speaking, or thoughts of objects: "when I will, or am afraid, or affirm, or deny, there is always a particular thing which I take as the object of my thought, but my thought includes something more than the likeness of that thing" (2:25–6; AT 7:37). So all thoughts are directed on some object, though of course the thing which is the object may not actually exist (as in the case of the chimera). These examples of ideas as thoughts of objects might suggest that ideas are non-propositional, but Descartes clearly recognizes that ideas can be propositional in form. In the *Principles* he lists things, affections of things, and eternal truths as "all the objects of our perception"; and eternal truths, or common notions, are propositional (1:208–9; AT 8A:22–3). Moreover, his theory of judgment requires that some ideas be propositional. The

intellect perceives, or “puts something forward for affirmation or denial” (2:40; AT 7:57); a judgment, susceptible of truth or falsity, results when the will affirms or denies. As Gewirth emphasizes, such an act of will can yield a judgment only if what the intellect puts forward is itself propositional (Gewirth 1943: 89). This is illustrated by Descartes’s description of the process of forming a judgment on the basis of a clear and distinct perception: “during the past few days I have been asking whether anything in this world exists, and I have realized that from the very fact of my raising this question it follows quite evidently that I exist. I could not but judge that something which I understood so clearly [sc. and distinctly] was true; . . . because a great light in the intellect was followed by a great inclination in the will” (2:41; AT 7:58–9). Here what the intellect perceives or understands is propositional; the perception of its truth draws the assent of the will. So the perceptions which are clear and distinct or obscure and confused are perceptions *that p* as well as perceptions *of x*, and ideas (since they are simply perceptions considered in terms of their content) vary similarly. Perceptions of *x* and perceptions that *p* are closely related, since whatever we clearly and distinctly perceive to be contained in the nature of some object *x* – that is, whatever is contained in the idea of *x* – can be truly affirmed of *x* (2:114–15; AT 7:162–3). Thus “divisibility is contained in the nature of body,” since we cannot conceive of any body “so small that we cannot divide it, at least in our thought” (2:115; AT 7:163). That presumably is why “an atom can never be conceived distinctly, since the very meaning of the word implies a contradiction, that of being a body and being indivisible” (3:154; AT 3:191). Thus the content of (what is contained in) a clear and distinct perception or idea *of* body implies *that* body is divisible.

Some Accounts of Clear and Distinct Perception

The best-known account of Cartesian clarity and distinctness is probably that provided by Gewirth (1943). The core of Gewirth’s interpretation is the notion that an idea of *x* is minimally clear if it contains the property which constitutes the nature and essence of *x*, and minimally distinct if it contains nothing contradictory to the essence of *x*. A minimally clear and distinct idea of *x* becomes clearer if more attributes necessarily connected with the nature of *x* are included in it. The idea thereby also becomes more distinct, since “the richer its content, the more is it distinguished from what is other than it” (Gewirth 1943: 90). This allows for an idea to be clear yet confused, if it contains what constitutes the nature of its object as well as something contradictory to that nature (see Gewirth 1943: 87, fn. 34). This is the case with the idea of pain in a body part, which Descartes gives as an example of an idea that is clear but confused; it contains the feeling of pain, which is a mode of thought, but confuses it with the idea of something resembling the feeling existing in a part of the extended body.

The notion that having a clear and distinct idea of *x* involves understanding what does and does not belong to the nature of *x* figures in other interpretations besides that of Gewirth. For example, Curley remarks that “having a clear and distinct idea of a thing . . . is a matter of seeing what is and what is not involved in being that thing or a thing of that kind” (Curley 1986: 169–70); more specifically, he proposes that “having a clear and distinct idea of a thing, or of a kind of thing . . . is a matter of recognizing

that there are certain properties we cannot but ascribe to a thing of that kind (clarity) and others which we are not at all compelled to ascribe to it (distinctness)” (*ibid.*). Similarly, Smith claims that an idea of x is clear just in case it exhibits the element or elements that constitute the nature of x , plus the relation that unifies them, if x is complex (Smith 2001: 294).

Gewirth distinguishes between what it is for an idea to be clear and distinct and the method by which these qualities are to be ascertained. His account of the latter is based on the *Rules for the Direction of the Mind*; he claims that one perceives a complex idea clearly and distinctly by reducing it to a combination of simple natures (Gewirth 1943: 94). Gewirth is not the only commentator to look to the *Rules*; Smith (2001) bases his account of clarity and distinctness on the theory of enumeration in that work. However, there are reasons to be skeptical about the value of the *Rules* as the basis for an interpretation of clear and distinct perception as it appears in Descartes’s later philosophy. The *Rules* is an early work, abandoned before Descartes began the physics for which the *Meditations* seeks to provide metaphysical foundations, and its aims and methods are very different from those of the *Meditations* and *Principles*. The *Rules* aims to provide a step-by-step procedure for the formulation and solution of mathematical problems which can be extended to problems arising in the empirical sciences – in effect, a universal method for problem solving. The *Meditations* aims to convert the meditator to the metaphysics underlying Cartesian physics by teaching him how to perceive clearly and distinctly. The withdrawal from the senses and elimination of prejudices by means of hyperbolic doubt so central to this process are absent from the *Rules*. So I am doubtful about the value of imposing the reductive method of the *Rules* on the analytical procedure of the *Meditations*. But this need not mean that we lack an account of Descartes’s method for ascertaining the clarity and distinctness of ideas. As Humber (1981) points out, Descartes’s criterion for distinguishing genuinely clear and distinct perceptions is constituted by his procedure for generating such perceptions. Descartes himself says as much in his reply to Gassendi. So let us turn to Descartes’s response, and look more closely at his procedure for making perceptions clear and distinct.

Obscurity, Confusion, and Prejudice

When Gassendi asks “what possible skill or method” will enable us to discover whether our understanding is clear and distinct, Descartes agrees that such a method is needed, but claims that it has already been given in the *Meditations*:

I maintain that I carefully provided such a method in the appropriate place, where I first eliminated all prejudices and afterwards listed all my principal ideas, distinguishing those which were clear from those which were obscure or confused. (2:250; AT 7:362; trans. alt.)

His reference to a listing of all principal ideas better fits the *Principles of Philosophy*, where such a list is explicitly given, than it does the *Meditations*. But Descartes does claim that in the *Meditations* he “explained, or at least touched on” all the relevant

examples of clear and distinct and obscure and confused perception; and he directs his readers to ponder on these in order to “accustom themselves to distinguishing what is clearly known from what is obscure,” since “this is something that it is easier to learn by examples than by rules” (2:116; AT 7:164).

That is not to say that the method is easy to learn. In the earlier *Discourse*, Descartes had noted that “there is some difficulty in recognizing which are the things that we distinctly conceive” (1:127; AT 6:33). He admitted that the argument of the *Discourse* was made obscure by the fact that he did not dare to expound the “strongest arguments of the sceptics” in order to accustom the reader to detach the mind from the senses (3:55; AT 1:353). Such skeptical arguments play a key role in the *Meditations*, where they are deployed with the aim of withdrawing the mind from the senses and freeing it from prejudices (2:9; AT 7:12). This elimination of prejudices is crucial in enabling the meditator to learn to distinguish what is clearly and distinctly perceived from what is obscure, as Descartes’s reply to Gassendi shows. When Gassendi suggested that the elimination of prejudices should have been dealt with in a “simple and brief statement,” rather than by running through the doubts of the First Meditation, Descartes was scornful: “Is it really so easy to free ourselves from all the errors which we have soaked up since our infancy?” (2:242; AT 7:348). He adds that those who expend so little effort on the elimination of prejudices are unlikely to master the method of distinguishing what we perceive clearly from what we merely think we perceive clearly (2:260; AT 7:379). The reason it costs such effort to make our perception of the primary notions of metaphysics clear and distinct is precisely because “they conflict with many prejudices derived from the senses which we have got into the habit of holding from our earliest years”; hence, “only those who really concentrate and meditate and withdraw their minds from corporeal things . . . will achieve perfect knowledge of them” (2:111; AT 7:157). Since the elimination of prejudices is so crucial, it is worth examining which prejudices Descartes has in mind, and just how they stand in the way of clear and distinct perception.

Descartes writes in the *Principles* that “in our childhood the mind was so immersed in the body that although there was much that it perceived clearly, it never perceived anything distinctly. But in spite of this the mind made judgments about many things, and this is the origin of the many prejudices which most of us never subsequently abandon” (1:208; AT 8A:22; trans. alt.). The price of retaining these prejudices is explained in the Seventh Objections: “those who do not abandon their prejudices will find it hard to acquire a clear and distinct concept of anything; for it is obvious that the concepts which we had in our childhood were not clear and distinct, and hence, if not set aside, they will affect any other concepts which we acquire later on and make them obscure and confused” (2:352–3; AT 7:518; trans. alt.). Descartes evidently regards the prejudices we acquire in childhood as the principal obstacle to clear and distinct perception. But what exactly is the connection between prejudices and obscure and confused ideas?

Prejudices are opinions that we continue to accept as a result of earlier judgments we have made (2:270; AT 9A:204), propositions that are “put forward without attention and believed to be true only because we remember that we judged [them] to be true previously” (2:271; AT 9A:205). So prejudices are not necessarily false, but they are judgments we make without sufficient reason, propositions we affirm without

understanding them clearly enough to see that they are true. This means that they cannot be based on a clear and distinct perception of what we affirm, since such a perception would provide sufficient reason for judgment. We form prejudices because we are able to judge where we do not clearly perceive; as Descartes puts it in the *Principles*, “we can assent to many things which we know only in a very obscure and confused manner” (1:204; AT 8A:18). So where there is a prejudice, there is an obscure and confused idea, and the prevalence of prejudice bears witness to the prevalence of obscure and confused perception. But Descartes believes that our predicament is even worse than this would suggest. Our longstanding habit of assent to prejudices produces the false belief (itself a prejudice) that they are based on clear and distinct perception. The confused idea of pain in a body part which Descartes discusses in the *Principles* is a case in point. We regard the pain “not as being in the mind alone, or in our perception, but as being in the hand or foot or in some other part of the body” (1:217; AT 8A:32). We wrongly suppose that something resembling the pain we perceive exists outside our minds in the hand or foot, just as we wrongly suppose that something resembling the colors we perceive exists outside our minds in colored things; and this supposition is “something that, *because of our habit of making such judgments, we seemed to see clearly and distinctly*” (1:216, trans. alt.; AT 8A:32, emphasis added).

The *Meditations* mentions further cases in which we mistake obscure and confused ideas for clear and distinct ones. In the Third Meditation, Descartes describes the belief that sensory ideas are caused by objects that they resemble as “something . . . which through habitual belief I thought I perceived *clearly*, although I did not in fact do so” (2:25; AT 7:35; emphasis added). A related mistake, reflecting “a habit of making ill-considered judgments,” is specified in the Sixth Meditation: the belief that sensory perceptions serve as reliable touchstones for immediate judgments about the essential nature of external bodies (2:56, 57–8; AT 7:82, 83). Sensory perceptions are sufficiently clear and distinct to inform us of what is beneficial or harmful for the mind-body composite, but they provide only obscure information about the essential nature of external bodies. The Second Meditation identifies the belief that corporeal things, which can be sensed and imagined, are understood more *distinctly* than immaterial things, which cannot (2:17, 20; AT 7:26, 29). So we think our prejudices are based on clear perception when they are not, we think the senses present us with clear perceptions of the essential natures of bodies when they do not, and we think we have a distinct conception of corporeal nature when we do not. Mistaking obscure and confused perceptions for clear and distinct ones is not a mistake to which we become vulnerable only once we have read the *Meditations*, and have been introduced to Descartes’s concept of clear and distinct perception. Thanks to our prejudices, it is a mistake we make already: “there are few who correctly distinguish between what they in fact [distinctly] perceive and what they think they [distinctly] perceive, for few are accustomed to clear and distinct perceptions” (2:348; AT 7:511). Not only are we unaccustomed to genuinely clear and distinct perceptions, we are so accustomed to obscure and confused perceptions that we take them for the genuine article. Descartes thinks that “most people have nothing but confused perceptions throughout their entire lives” (1:220; AT 8A:37). But the habit of assent to these confused perceptions is so familiar that we take them for clear ones, and thus “we make the mistake of thinking that we clearly perceive what we do not perceive at all” (1:218; AT 8A:35).

We now have some sense of the way in which, according to Descartes, habits of assent to obscure and confused ideas originate in infancy and persist in adult life. This lifelong habit of assent is not easily broken. As Descartes has the meditator say in the First Meditation, “my habitual opinions keep coming back, and, despite my wishes, they capture my belief, which is as it were *bound over* to them as a result of long occupation and the law of custom” (2:15; AT 7:22; emphasis added). There is a common theme to these habitual opinions: they reflect the infant mind’s immersion in the body and pre-occupation with sensible things. Looking back on her pre-meditative state, the meditator finds that sensory ideas were “much more lively and vivid and even, in their own way, more distinct” than those she formed herself (2:52; AT 7:75). Sensory ideas vie for her attention even during the course of meditation; she finds that “when I relax my concentration . . . my mental vision is blinded by the images of things perceived by the senses” (2:32; AT 7:47). As long as the pull of sensory ideas is a pull towards “the ill-considered judgments of childhood” (1:222; AT 8A:39), it must be opposed. So Descartes has a twofold task if he is to achieve his aim of teaching his readers how to form clear and distinct ideas: he must break their habit of assent to prejudices, and he must draw their minds away from sensory ideas. Both tasks are begun in the First Meditation. Descartes describes freeing the mind from prejudice and drawing it away from the senses as the greatest benefit of the doubt produced by the First Meditation arguments (2:9; AT 7:12). The doubt acts as a solvent for prejudice because prejudices are based on obscure and confused perception, and it is precisely this that makes them doubtful. Descartes writes that doubt is possible wherever our perception is “even the slightest bit obscure and confused; for such obscurity, whatever its degree, is quite sufficient to make us have doubts in such cases” (2:103; AT 7:145). Obscurity and confusion are not only sufficient for doubt, they are necessary; clear and distinct perception makes doubt impossible. Descartes writes in the Seventh Replies that the renunciation of beliefs aimed at in the First Meditation “applies only to those who have never yet perceived anything clearly and distinctly. The sceptics, for example, for whom such a renunciation is commonplace, have never, qua sceptics, perceived anything clearly. For the very fact that they had perceived something clearly would mean that they had ceased to doubt it, and so ceased to be sceptics” (2:321; AT 7:476–7).

However, the First Meditation does not simply give the meditator reason to doubt her habitual beliefs; that would not suffice to free the mind from its bondage to habitual opinions. To counteract “the weight of prejudice” and correct “the distorting influence of habit,” Descartes has the meditator pretend that her former opinions are “utterly false and imaginary” (2:15; AT 7:22). He likens this to bending a curved stick in the opposite direction in order to straighten it (2:242; AT 7:242). The pretense of falsity is put into effect in a way designed to draw the mind away from the senses; the meditator pretends that she is being deceived by a demon who supplies delusive sensory ideas. She supposes that “the sky, the earth, the air, colours, shapes, sounds and all external things” are delusions fabricated by the demon, as are the belief that she has hands, eyes, flesh, blood and senses (2:15; AT 7:22–3). But how exactly do the withdrawal from the senses and elimination of prejudices resulting from the First Meditation doubt enable the meditator to form and recognize clear and distinct ideas? It is time to examine this process by looking at the way in which the meditator is guided to a clear and distinct perception of the mind and of the piece of wax in the Second Meditation.

Clear and Distinct Perception in the Second Meditation

The Synopsis states that the Second Meditation enables the meditator to form “a concept of the soul which is as *clear* as possible and is also quite *distinct* from every concept of body” (2:9; AT 7:13; emphasis added). Descartes warns that “protracted and repeated study is required to eradicate the lifelong habit of *confusing* intellectual things with bodily things, and to replace it with the opposite habit of *distinguishing* the two”; that, he says, is why he devoted the whole of the Second Meditation to this topic alone (2:94; AT 7:131; trans. alt., emphasis added). This contrasting of *confusing* with *distinguishing* indicates that “distinct” and “confused” are contraries, as are “clear” and “obscure.” It also indicates that there is a connection between making the idea of *x* distinct, and distinguishing what belongs to *x* from what has been wrongly attributed to it. Not surprisingly, Descartes holds that the habit of confusing ideas of what belongs to the mind with ideas of things that can be perceived through the senses originates in childhood. Since the mind was so attached to the bodily organs in childhood, “it never exercised its intellect on anything without at the same time picturing something in the imagination. It therefore took thought and extension to be the same thing, and referred to the body all the notions which it had concerning things related to the intellect” (2:297; AT 7:441). Retaining these childhood prejudices in later life, “there was nothing that [it] knew with sufficient distinctness, and there was nothing that [it] did not suppose to be corporeal” (2:297; AT 7:441). Somehow, the mind’s persistent preoccupation with sensible things must be reversed, so that it can perceive its own nature clearly and distinctly. Descartes claims that the Second Meditation teaches the only method of drawing the mind away from the senses and enabling it to distinguish what belongs to itself from what belongs to body. But what exactly is this method?

The Synopsis of the Second Meditation states that in it,

the mind uses its own freedom and supposes the non-existence of all the things about whose existence it can have even the slightest doubt; and in so doing the mind notices that it is impossible that it itself should not exist during this time. This is also of the greatest benefit because in this way it easily distinguishes what pertains to itself – that is, to an intellectual nature – from what belongs to body. (2:9; AT 7:12; trans. alt.)

The things that the mind supposes to be non-existent are things perceived through the senses, corporeal things. The meditator supposes that everything she sees is spurious, that she has no senses, that body, shape, extension, movement, and place are chimeras (2:16; AT 7:24). In this way the pretense of being deceived by a demon draws the meditator away from her preoccupation with the senses. When the thought first occurs that nonetheless she is something, her response is: “But I have just said that I have no senses and no body. This is the sticking point . . . Am I not so bound up with a body and with senses that I cannot exist without them?” (2:16; AT 7:24–5). This “sticking point” reflects the meditator’s obscure and confused conception of himself as something corporeal, originating in the childhood habit of referring everything belonging to the mind to the body. The meditator begins to move beyond this conception by reflecting that if he convinced himself of something, or if he is the victim of a deceiver, then he must exist. This shows him that “*I am, I exist* is necessarily true whenever it is

put forward by me or conceived by the mind" (2:17; AT 7:25). But the I that now knows that it exists does not yet have a sufficient understanding of what it is (2:17; AT 7:25). The meditator's perception of his own nature is still obscure and confused. He begins to clarify his idea of what he is by removing from it everything that is called in doubt by the supposition of deception by the demon. This begins the process of eliminating the bodily elements in the meditator's self-conception, and thus of distinguishing what belongs to mind from what belongs to body.

What belongs to mind, the meditator discovers, is thought. Thought does figure in the meditator's obscure and confused perception of herself as a corporeal thing; but it is referred to a soul regarded as responsible for the bodily activities of nourishment, motion, and sensing, and imagined as a vapor permeating the body (2:17; AT 7:26). Thought is isolated from these other elements in the meditator's conception of herself through the process of doubting. The meditator reflects that as long as she thinks, it is impossible that she should not exist; that is certain. But it is possible that she should cease to exist if she ceased to think. So the only thing the meditator can affirm without fear of error, the only thing that is "necessarily true," is that she exists as long as she thinks. In this sense, thought is "inseparable" from what she knows to exist (2:18; AT 7:27). The meditator concludes that she is a thinking thing, a mind or intellect or reason: "words whose meaning I have been ignorant of until now" (2:19; AT 7:27). At this point the mind perceives its own nature for the first time. But there is more to be done to reveal what belongs to that nature, and to distinguish it from what belongs to the nature of body; more to be done, in other words, to develop a clear and distinct idea of mind, and to begin to develop a clear and distinct idea of body. The meditator's idea of herself as a thinking thing has been formed by subtracting extraneous elements, elements that do not belong to the I whose existence is discovered via the process of doubting. The next step is to expand that idea by exploring what else belongs to the thinking thing.

Descartes is particularly concerned to undo the habit of thinking in corporeal terms, of using the imagination rather than the intellect, and thereby confusing what belongs to mind with what belongs to body. The meditator reflects that imagining is "simply contemplating the shape or image" of corporeal things; but the existence of such things is in doubt. So the mind must be "most carefully withdrawn" from the imagination, just as it must be drawn away from the senses, "if it is to perceive its own nature as distinctly as possible" (2:19; AT 7:28; trans. alt.). When the mind reflects on itself without employing images of corporeal things, it finds that it is capable of various acts such as doubting, understanding, affirming, denying, willing, imaging, and sensing (2:19; AT 7:28–9). The meditator asks: "Which can be distinguished from my thinking? Which can be said to be separate from myself? The fact that it is I who am doubting and understanding and willing is so obvious [*manifestam*] that I see no way of making it any clearer [*evidentius*]" (2:19; AT 7:29; trans. alt.). Presumably these acts cannot be distinguished from thinking because they are ways of thinking, modes of thought; and they are modes of thought of which the same thinking thing is the subject. A little more work is needed to show the meditator that the I who doubts, understands, and wills is also the I who imagines and senses. Descartes reflects that even if none of the (corporeal) things he imagines are real, the power of imagining them is still "part of my thinking" (2:19; AT 7:29). The case of sensing, or "noticing corporeal

things as if through the senses" (2:19; AT 7:29; trans. alt.), is less straightforward. Descartes points out that even if I am asleep, and so do not succeed in sensing light, noise, or heat, still it seems to me that I do so. My certainty that I seem to sense survives the doubt, and sensing in this strict sense is "simply thinking" (2:19; AT 7:29). Descartes draws attention to the fact that sensing a thing in his strict sense, like imagining something, does not require that the thing exists; we can know that we think we sense bodies while continuing to doubt that any bodies exist.

At this point a clear and distinct conception of the mind is substantially in place. The meditator knows that she is, in the words of the Third Meditation, "a thing that thinks: that is, a thing that doubts, affirms, denies, understands a few things, is ignorant of many things, is willing, is unwilling, and also which imagines and senses" (2:24; AT 7:34; trans. alt.). But Descartes now has the meditator confront one of her central epistemic prejudices, the belief that corporeal things which can be imagined and sensed are "more distinctly perceived" than the puzzling I which cannot. This prejudice is attacked through reflection on the piece of wax, a body that can be touched and seen and is therefore of the kind thought to be understood "most distinctly of all" (2:20; AT 7:30). The wax can be perceived through all five senses; it "has everything which appears necessary to enable a body to be known as distinctly as possible" (2:20; AT 7:30). But the fact that the features falling under the senses can change while the same wax remains shows that is not the senses that provide the meditator with a distinct grasp of the wax as an object that persists through change. The wax is a body that can present itself to the senses in different ways while remaining the same wax. Pursuing this line of thought, the meditator resolves to "attend, remove what does not belong to the wax, and see what remains" (2:20; AT 7:30–1; trans. alt.) – that is, to apply a subtractive procedure similar to that used to reveal the nature of the mind. The procedure yields a conception of the wax as a thing that is "capable of being extended in many more different ways" than can be pictured in the imagination (2:21; AT 7:31). Since this understanding of the wax's potential to take on different shapes outstrips the representational capacity of the imagination, it must be an intellectual understanding. The nature of the wax is, and has always been, perceived by the intellect, "the mind alone"; the difference is that such a perception can be "imperfect and confused, as it was before, or clear and distinct, as it is now, depending on the degree to which I attend [*minus vel magis . . . attendo*] to what the wax consists in" (2:21; AT 7:31; trans. alt., emphasis added). The transition from an obscure and confused perception of the wax to a clear and distinct perception is effected through closer attention to what the wax consists in, what it is; and presumably the same is true, *mutatis mutandis*, of the transition to a clear and distinct perception of the mind.

What is involved in paying closer attention to what the wax, or the mind, consists in? In each case, the meditator first discovers that certain properties thought to pertain to the nature of the thing in question do not in fact do so (we might call this the eliminative phase). She then discovers that certain properties not yet recognized as pertaining to its nature do in fact do so (we might call this the ampliative phase). The eliminative phase yields a conception which reveals what constitutes the thing's nature (thinking, being extended), while the ampliative phase expands this conception by exploring what belongs to such a nature (various modes of thought, innumerable ways of being extended). The meditator first homes in on the essence of the

thing, excluding what does not belong to it, and then draws out what does belong to it.

The Nature of Clear and Distinct Perception

The two examples of clear and distinct perception given in the Second Meditation suggest an initial account of clarity and distinctness in the spirit of Gewirth's: a clear and distinct perception of x reveals what constitutes the nature of x , and contains nothing that does not belong to a nature so constituted. But even if this is part of the account of what it is for a perception or idea to be clear and distinct, it cannot be the whole story. As Smith (2001) emphasizes, Descartes speaks of clarity and distinctness as matters of degree; for example, "If my perception of the wax seemed *more* distinct . . . it must be admitted that I now know myself even *more* distinctly" (2:22; AT 7:33; emphasis added). And as Smith also emphasizes, the definitions of clarity and distinctness given in the *Principles* imply that a perception can be clear without being distinct. The initial proposal does not indicate how clarity and distinctness can be a matter of degree, nor how a perception can be both clear and confused. So let us turn to the definitions given in the *Principles of Philosophy*.

In the *Meditations*, "clear" and "distinct" seem to be used as correlatives, as are "obscure" and "confused." But the definitions provided in the *Principles* entail that a perception can be both clear and confused, though it cannot be distinct unless it is clear. A perception is said to be clear when it is "present and open [*praesens et aperta*] to the attending mind – just as we say that we see things clearly when, being present to the regarding eye, they move it sufficiently strongly and openly" (1:207; AT 8A:22). A distinct perception is one that is not only clear, but "so sharply separated from everything else that it plainly contains nothing but what is clear" (1:208; AT 8A:22). Obviously, then, a distinct perception must be clear. Descartes uses the example of pain to show that a clear perception need not be distinct. When someone feels a great pain, the perception of pain is extremely clear (*clarissima*, the superlative of *clarus*); but it is not always distinct, because people commonly confuse it with an obscure judgment. This judgment concerns the nature of some thing, resembling the sensation of pain, which is thought to exist in the painful part of the body (1:208; AT 8A:22). Later in the *Principles*, Descartes remarks that when pain is judged to be a real thing (*res*) existing outside the mind in the painful part, there is no way of understanding what this thing is; those who make such a judgment are ignorant of what they suppose to exist in the painful part (1:217; AT 8A:33). In the Second Replies Descartes writes that whenever we call a conception obscure or confused, this is because it contains some element of which we are ignorant (2:105, AT 6:147). When the pain felt is confused with something resembling the pain existing in a part of the body, there is an element contained in the perception of which we are ignorant: namely, that which is thought to resemble the feeling and to exist in the body part. The clear but confused perception of pain is clear, but not wholly clear; it contains an element that is not understood, not present and open to the mind.

Perceptions of pain, like perceptions of other sensory qualities, pose particular interpretive problems which will be discussed in the next section. The present question is

how the proposal based on the *Meditations* can be related to the definition offered in the *Principles*. The proposal is that a clear and distinct perception of x reveals what constitutes the nature of x and what belongs to a nature so constituted. The definition says that a clear and distinct perception of x contains only what is present and open to the attending mind. Proposal and definition can be connected if we suppose that the nature of x and what belongs to it is made present and open to the attending mind in a clear and distinct perception of x . The fact that a distinct perception contains nothing that is not present and open means that such a perception contains nothing that is hidden or concealed, no element of which we are ignorant.

However, to say that nothing in a distinct perception of x is hidden or concealed is not to say that the perception reveals all there is to know about x . To say that would be to erase a distinction on which Descartes insists, the distinction between distinct and adequate perception. Adequate knowledge, and presumably adequate perception, “must contain absolutely all the properties which are in the thing which is the object of knowledge” (2:155; AT 7:220). Descartes holds that a created intellect may have adequate knowledge of many things, but cannot know that it has such knowledge unless God grants it special revelation of that fact (2:155; AT 7:220). Since divine revelation is not needed in order to know that one has a clear and distinct perception, an idea of x need not contain all the properties of x in order to be clear and distinct. But the fact that a clear and distinct perception of x contains nothing that is hidden or concealed means that there is nothing contained in the perception that would be seen, on closer examination, not to belong to the nature of x . Indeed, there is presumably nothing contained in a distinct perception of x that requires closer examination in order for its relationship to x ’s nature to be ascertained, for such a thing would not be wholly present and open to the attending mind. Of course, it may be possible to expand an already clear and distinct perception of x by including in it more of what belongs to or follows from x ’s nature; but to do that would be to make the perception more distinct by including in it more that is clear, as Gewirth points out. This indicates how clarity and distinctness can be a matter of degree. Descartes holds that “the more attributes we discover in the same thing or substance, the clearer is our knowledge of that substance” (1:196; AT 8A:8). That is why he describes the mind as better known than body in the Second Meditation; for every attribute we distinguish in a body, we can distinguish the attribute of knowing it in the mind (2:249; AT 7:360). Hence the examination of the wax enables the meditator to know her own mind “even more distinctly” (2:22; AT 7:33).

Descartes comments that “a concept is not any more distinct because we include less in it; its distinctness simply depends on our carefully distinguishing what we do include in it from everything else” (1:215; AT 8A:31). I take this to mean that our perception of x is not made more distinct simply by reducing the number of properties we attribute to x . As we have seen, expanding the content of a perception can make it more distinct. The perception of x becomes distinct through our ensuring that there is nothing included in it that does not belong to the nature of x . So a perception becomes clearer and more distinct by including in it more that belongs to the nature of its object, and excluding from it anything that does not belong to that nature. A perception of x can be clear yet confused if it contains what belongs to the nature of x together with something that does not belong to it. It becomes distinct by excluding everything that does

not belong to the nature of x , so that what belongs to x 's nature is no longer confused with what belongs to something else.

Questions About Sensory Ideas

As noted earlier, all Cartesian thoughts (and hence all Cartesian ideas) are intentional; all are directed on objects. Notoriously, Descartes has the meditator say in the Third Meditation that her ideas of heat and cold are so obscure and confused – “contain so little clarity and distinctness” – that she cannot tell whether they are ideas of real things or of non-things; she cannot tell whether they are ideas of real qualities, or privations, or neither (2:30, AT 7:44). The Scholastic Aristotelian view of heat, cold, and other proper sensibles as real qualities resembling sensations and inhering in bodies is under attack here. In the Sixth Meditation, the meditator learns that it is right to think that bodies which cause sensory ideas of hot and cold differ in some way, but wrong to conclude that they differ in possessing qualities that resemble the sensory ideas themselves. To judge this is to make the mistake of treating sensory perceptions as though they provided reliable guides to the essences of external bodies, about which they signify nothing that is not obscure and confused. Their proper purpose is to signify to the mind the benefits and harms that external bodies offer to the human composite of which it is a part, and to that extent they are sufficiently clear and distinct (*eatenus sunt satis clarae et distinctae*, 2:57–8; AT 7:83).

These claims raise two questions about sensory ideas. Firstly, what are sensory perceptions obscure and confused perceptions of? Secondly, what does Descartes mean by saying that they are sufficiently clear and distinct to the extent that they inform us of benefits and harms? It is important for the first question that Descartes says that sensory ideas provide *obscure and confused* information about the essences of external bodies, not that they provide no such information. In speaking of the *essence* of an external body, I take it that he is speaking of its intrinsic nature as a configuration of extension, in contrast to its relational property of affecting the functioning of human bodies in certain ways. So what he says is compatible with the view that sensory perceptions are perceptions of the corpuscular structure of external bodies, although they present that structure in such an irremediably obscure and confused way that we cannot discern this from the ideas themselves. Descartes writes in Part Four of the *Principles* that “the properties in external objects to which we apply the terms light, colour, smell, taste, heat and cold . . . are, so far as we can see, simply various dispositions in those objects [French version: in the shapes, sizes, positions and movements of their parts] which make them able to set up various motions in our nerves” (1:285; AT 8A:322–3). An object is green, then, in virtue of having a corpuscular structure which enables it to produce certain ideas in us; but no amount of interpretation of the kind pursued in the Second Meditation will enable us to turn a sensory perception of green into a clear idea of that corpuscular structure.

How can it be that a non-deceiving God has given us these irremediably obscure and confused ideas? This is where the proper purpose of sensory ideas comes in. Sensory ideas represent the dispositional properties of external bodies in a manner that is useful for the preservation of our bodies. Through them the powers of external bodies to help

or harm are made salient to us (for discussion, see Simmons 1999). But when Descartes says that sensory ideas are sufficiently clear and distinct insofar as they inform us of such powers, does he mean that they are clear and distinct ideas of those powers *tout court*? If they were clear and distinct ideas of powers *tout court*, we should presumably be able to discover their objects by reflecting on and analyzing the ideas themselves. But our knowledge that they are ideas of powers to harm or help is arrived at by an indirect route, by reasoning to their place in the nature bestowed on us by God. So perhaps in calling sensory ideas *sufficiently* clear and distinct, he simply means that their obscurity and confusion is no barrier to their serving their preservative function; as long as we understand their significance, we can use them as a basis for reliable judgments about the powers of bodies to harm or help us.

How do internal sensations such as pain and hunger fit into this picture of sensory ideas? Like sensations of light and sound, sensations of pain and hunger are conferred on us to aid the preservation of the mind-body composite. But while sensations of light and sound inform us of the powers of external bodies, sensations of pain and hunger inform us about our own bodies. Descartes writes in the Sixth Meditation that “there is nothing that my own nature teaches me more vividly than that I have a body, and that when I feel pain there is something wrong with the body, and that when I am hungry . . . the body needs food” (2:56; AT 7:80). But like sensations of light and sound, sensations of pain and hunger are modes of thought, ideas or perceptions; and if they are ideas, they must be intentional. What do they represent? What are they perceptions of? The natural answer is that they are perceptions of our own bodies, representations of the condition of our bodies. In the Sixth Meditation Descartes famously says that if he were simply present in his body like a pilot in a ship, he would not feel pain when the body was hurt, but would perceive the damage purely by the intellect. This is at least compatible with the view that feeling pain is a way of perceiving damage to the body. As with the external senses, the perception is irremediably confused; a feeling of pain in the foot cannot be distilled into a clear and distinct perception of damage to the foot. Sensations of hunger, thirst, and pain are “nothing but *confused modes of thinking* which arise from the union . . . of the mind with the body” (2:56; AT 7:81; emphasis added).

So far, so good; internal sensations take their place alongside external sensations as obscure and confused perceptions of bodies designed to aid the preservation of the mind-body composite. But the discussion of sensory ideas in the *Principles* takes a different tack. Here Descartes introduces the notion of perceptions that are *clear* but confused. The perception of intense pain is said to be clear, but “not always” distinct, because it is commonly confused with an obscure judgment that something resembling the perception exists in the painful spot. In fact, Descartes says, the sensation alone is perceived clearly. This makes it sound as though the sensation itself could be rendered clear and distinct *tout court* if the obscuring judgment were eliminated. But this is surely very implausible; if pains are perceptions of harm to our bodies, they are surely irremediably obscure and confused perceptions of such harm.

Fortunately, we need not interpret Descartes as saying that the sensation itself can be turned into a clear and distinct idea of its object. The idea that starts out clear and confused, but can be made clear and distinct, is not the sensation itself but an idea that has the sensation as its object. The idea or perception of pain – the idea of what pain is

– becomes confused when an obscure and erroneous judgment about what pain is intrudes. If we simply think of pain as a sensation, an idea or mode of thought, our idea of it will be clear and distinct (1:216; AT 8A:32). But the clear and distinct idea in question here is an idea *of* pain, not the idea that is the pain itself. If it is clear and distinct, it must be true; and so it is, because the pain that is its object is a mode of thought, and the idea represents it as such. The idea that is the pain remains an irremediably obscure and confused perception of the body.

The same two-tier account is discernible in Descartes's discussion of the idea of cold in the Fourth Replies. Arnauld had asked how the idea of cold could be materially false if, in accordance with Descartes's model of intentionality, it is simply cold itself existing objectively in the intellect (2:145; AT 7:206). Descartes responds that the obscurity of the "confused ideas arriving from the senses" (2:163; AT 7:233) means that we are liable to mistake their objects (as we mistake the object of the feeling of pain, taking it to be something resembling the feeling existing in the painful part). The obscurity of the idea of cold arriving from the senses, the "actual sensation" (2:164; AT 7:235), leads us to confuse the sensation with something resembling it existing in the cold thing itself. Now there are two confused ideas in play: the sensation itself, and the idea of the sensation which depicts it as a quality existing in a cold body. The idea that is the sensation deserves to be called materially false, Descartes explains, because its obscurity provides the material for a false judgment: "the obscurity of the idea [sc. the sensation] . . . leads me to judge that *the idea of the sensation of cold* represents some object called 'cold' which is located outside me" (2:164; AT 7:234–5; emphasis added).

In this two-tier account, attention shifts to the idea that takes the sensation as its object. The emphasis in the *Principles* lies on the importance of making this idea clear and distinct by recognizing that it is an idea of a mode of thought, an idea of an idea. Descartes writes that "pain and colour and so on are clearly and distinctly perceived when they are regarded merely as sensations or thoughts. But when they are judged to be real things existing outside our minds, there is no way of understanding what sort of things they are" (1:217, AT 8A:33). Modes of mind must not be confused with qualities of bodies, which possess only modes of extension. But if pain is a mode of mind, an idea, it must have an intentional object. This intentional dimension of pain is absent from the discussion in the *Principles*. For all Descartes says about it, the sensation itself could be what Ayers calls "a blank effect," devoid of any content, however obscure and confused (Ayers 1991: 62). Presumably this is no accident. The model according to which the idea of *x* is *x* itself existing objectively in the intellect gains little purchase when the idea in question is so irremediably obscure and confused that the object it contains cannot be recovered from it.

Conclusion

One thing that is uncontroversially true of clear and distinct ideas or perceptions as Descartes understands them is that they are true. Clear and distinct perception compels the will to assent, and if our creator had molded our minds so that we were compelled to assent to falsehoods, he would be a deceiver. Since God is not a deceiver, he has molded our minds in such a way that clear and distinct perception compels us to assent

only to truths. But there are two different ways in which God might have achieved this, and so two possible interpretations of the nature of clear and distinct perception. According to the first, clear and distinct perception is a phenomenally distinctive experience, a kind of feeling that compels the will to assent. God has molded our minds so that we have this experience only when we perceive contents that are true, and thus we are only compelled to assent to truths. According to the second, clear and distinct perception is the perception of a content that we find self-evidently true, and God molds our minds so that we find true contents self-evidently true. These views of clear and distinct perception might be described as phenomenal and intentional, respectively. On the intentional view, clarity and distinctness are a feature of the content perceived, while on the phenomenal view they are a feature of the perceiving of it. On the phenomenal view, the compulsion to assent to what is clearly and distinctly perceived is a form of brute compulsion, while on the intentional view it is a form of rational compulsion. The phenomenal view accords with a popular reading of Descartes's conception of the mind, one that David Chalmers expresses when he says that "with his notorious doctrine that the mind is transparent to itself, [Descartes] came close to identifying the mental with the phenomenal" (Chalmers 1996: 12). On this view, recognizing genuine clear and distinct perceptions is a matter of recognizing a distinctive phenomenal feel, one that is known by being experienced rather than by being described. This accords with Descartes's claim that the method of identifying such perceptions is better learned from examples than by rules, and it might be thought to account for the uninformative nature of his one attempt at explicit definition. If what it is like to perceive clearly and distinctly can only be identified ostensively as that type of experience that makes doubt impossible, no wonder Descartes does little better than compare it to a pain.

But according to the account of clear and distinct perception I have been developing, it is the intentional view that we should prefer. The view of clarity and distinctness as a subjective quality of experience does not sit well with what Descartes says about why we are compelled to believe when we clearly and distinctly perceive. He writes in the *Rules* that "whenever two people make opposite judgments about the same thing . . . neither, it seems, has knowledge [*scientia*]. For if the reasoning of one of them were certain and evident, he would be able to lay it before the other in such a way as eventually to convince his intellect as well" (1:11; AT 10:363). If someone perceives some truth clearly and distinctly, he has convincing reason to believe it. But in that case, it should be possible to present that reason to others so that they too can be convinced. The *cogito* provides a paradigm of clear and distinct perception: we cannot but believe that we exist as long as we think, because we understand that it cannot but be true. It is the content of what we clearly and distinctly perceive that compels us to assent. In the Third Meditation, the rational compulsion to believe what we clearly and distinctly perceive is contrasted with the "spontaneous impulse" to believe in the existence of external bodies resembling our sensory ideas; the latter is "blind impulse," the former "reliable judgment" (2:26–7; AT 7:38–40).

Where does this leave Descartes with respect to the complaint with which we began, the objection that he has no satisfactory criterion for identifying clear and distinct perceptions? The force of the objection obviously depends on what is to count as a satisfactory criterion. Descartes told Gassendi that he had provided a method for

distinguishing between genuine and spurious clear and distinct perceptions in the *Meditations*. But the method is not foolproof; it remains possible to make mistakes, to think one is perceiving clearly and distinctly when one is not. Does this make the criterion unsatisfactory? Is it a fatal flaw in Descartes's project? It can certainly seem so, if his project is interpreted as that of defeating skeptical doubt by ruling out all possibility of error. But this is not how Descartes himself depicts his aim. As we have seen, the *Meditations* is designed to teach us to form clear and distinct perceptions. This teaching is needed because without it we will remain mired in the pervasive error, prejudice, and ignorance that results from our childhood reliance on the senses. It is not the possibility of error that makes the First Meditation doubt possible (and necessary); it is the fact of it. According to Descartes, the mere possibility of an error we are given no reason to believe in need not bother us (2:103; AT 7:145). The meditator's beliefs fall prey to doubt at the beginning of the *Meditations* because they are based on obscure and confused perception, affirmed through the compulsion of habit rather than through the rational compulsion of clear and distinct intellectual perception. She is even able to doubt the truth of what seems most evident to her, since she does not clearly and distinctly perceive the author of her nature. Through meditation, she forms judgments that resist doubt because they are based on a clear and distinct perception of the truth of what is affirmed. In particular, she comes to clearly and distinctly perceive that her creator is not a deceiver, and that the intellectual faculty that he has given her cannot but tend towards the truth (2:104; AT 7:146). She now has a new way of using her God-given faculties and a new understanding of the nature of God's creation. But this does not banish the possibility of error; she remains capable of going astray by misusing her faculties. In the closing words of the *Meditations*, "we must acknowledge the weakness of our nature" (2:62; AT 7:90). Our fallibility is inescapable; but as long as Descartes is not saddled with the aim of providing a panacea against all possible error, it is not fatal for his project.

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Chapter 14

Causation Without Intelligibility and Causation Without God in Descartes

MICHAEL DELLA ROCCA

Two Revolutionary Humean Steps

In his classic paper “Causality and Properties,” Sydney Shoemaker – apparently to his own surprise – came to endorse the view that causal connections hold with metaphysical necessity. “I thus find myself,” he says at the end of his paper, “in what I once would have regarded as reactionary company” (Shoemaker 2003: 232). It is odd that espousing such a view of causation should be surprising because, for many years, the view that causation is necessary connection held sway in philosophy. Indeed, for some time a prominent view was the even stronger view – which Shoemaker does not endorse – that the necessary connection between cause and effect is a conceptual connection. This stronger view is stronger because it entails that it is not conceivable that the cause exists and the effect does not, whereas the weaker view does not have this entailment. (The stronger position is held, in different ways, by Malebranche, Spinoza, and Leibniz.) How could opinions change so drastically that one can now hardly imagine a philosophical space in which the idea of causation as necessary – let alone conceptual – connection can be treated as a live option? The answer – in a word – is “Hume.” Of course, Hume had considerable help from the likes of Locke, Berkeley, and others. But only with Hume was there a decisive break with the notion of causation as conceptual connection.

In saying that Hume overthrew this notion, I don’t mean to imply that Hume himself was entirely free of ambivalence on this matter. In fact, I believe that Hume was troubled by his conclusion that causes are not conceptually connected with their effects. This concern is, I believe, on display in Hume’s remark that his definitions of cause are “so imperfect” that they must be “drawn from something foreign and extraneous to” the cause (Hume 1975: 76; see also Hume 1978: 266–7). But here is not the place to enter into the subtleties of Hume’s position; rather, I offer this broad sweep through Hume’s account of causation because it can, I believe, help to situate Descartes’s account vis-à-vis his Aristotelian predecessors and his occasionalist successors.

The Humean critique of the idea of causation as conceptual connection is part of his broader onslaught against the idea that causes explain their effects, that they make their effects intelligible. Of course, if, as on the conceptual connection account, it is part

of the very concept of A that, if A exists then an effect, B, exists, then we can see how A – considered by itself – can be said to explain B. In such a case, simply by considering A we can, as it were, see B coming. But even without such an insistence on conceptual connection, many philosophers demanded that there be something about a cause – considered by itself – that enabled the cause to explain the effect, to render it intelligible. This was a guiding theme of the Aristotelian account of causation that was dominant in the Scholastic philosophy with which Descartes was familiar. In very general and oversimplified terms, according to these views, one substance acts on another in virtue of its substantial or accidental forms. The substantial form, of course, provides a component which, together with matter, results in a complete substance. But also and more relevantly for our purposes, the substantial form (together with the accidental forms) serves as the locus of causal explanations. Such forms – so it was argued and so it was hoped – enable us to explain the characteristic behavior of finite substances (see Nadler 1998: 515). Descartes understood the Aristotelian tradition this way. Writing to Regius in 1642, Descartes said that substantial forms “were introduced by philosophers solely to account for the proper actions of natural things, of which they were supposed to be the principles and bases” (2:208; AT 3:506). The connection between a substance and its effect provided by a form would not amount to something as strong as a conceptual connection. After all, it was thought that in order for the form to operate, it was not sufficient merely for the substance to have this form. Rather, at a minimum, God’s conservation of the substance and, for many writers in the Aristotelian tradition, God’s concurrence with the activity of the substance were also needed for the effect to exist (Freddoso 1988). Nonetheless, the forms of a substance were seen as uniquely well-suited for enabling us to explain the effect.

As I just intimated, the explanation of effects in terms of substantial forms was the hope. Obviously, such hopes were dashed – long before Hume – by earlier, mechanistic philosophers and scientists, including Descartes, who saw explanation in terms of forms as unilluminating at best. This criticism may be apt, but the point to emphasize here is that the aspiration by Aristotelians was to see causes as explaining their effects and that this aspiration was shared by non-Aristotelian philosophers who saw causation as conceptual connection.

Hume argues that the explanatory aspirations of both these camps are bankrupt. For Hume, causes do *not* make their effects intelligible. Yes, there are causes which are followed by effects in a regular fashion, but this regularity is not enough to explain the effect in terms of its causes, to make us understand why the effect exists. For Hume, there is nothing about the cause – taken on its own – that would enable us to see the effect coming. This is in contrast to the Aristotelian view according to which the substance has a form that enables us to see – just by considering the cause – the effect coming. For Hume, it is also not the case, as it would be on the conceptual connection account, that simply from the concept of the cause one could infer that the effect would occur. For Hume, then, causes do not make their effects intelligible. Of course, the cause *together with* certain independent facts, such as the fact of regularity or constant conjunction, may, for Hume, explain the effect. But the crucial point here is that the cause – taken on its own – does not explain the effect. This rejection of the idea that causes render their effects intelligible is what I will refer to as the first key step in Hume’s critique of the notion of causation.

The second key step is the elimination of God from Hume's account of causation. Prior to Hume, most philosophical accounts of causation gave God a primary role to play. Of course, for the occasionalists, God is directly active in causing change, active to an extent that surpasses the extent of God's direct action according to rival accounts of causation. But God does play a very significant causal role in any number of non-occasionalist accounts too. As I mentioned, on Aristotelian views, God must conserve finite substances in existence in order for those substance to be causes, and, for most Aristotelians, God must also concur with the action of those substances. According such roles to God does not sit well with Hume as a naturalist. Just as in the case of causation as conceptual connection, it was only with Hume that there was a decisive break with the tendency to have God play a direct role in one's philosophy of causation.

Where does Descartes fit in with regard to these developments? It's difficult to say – and not just because Descartes is among the most cagey of philosophers. It's difficult also because, in recent interpretations especially, Descartes's thinking on causation has been assimilated in one way or another either to that of his Aristotelian predecessors or to that of his occasionalist successors. Such interpretive endeavors have been of tremendous importance, and we owe a great deal to this continuing work. But, we must also be open to the possibility that what Descartes is fundamentally getting at in his account of causation is something that should also be seen in very different terms. I will argue that close attention to the way in which Descartes himself frames the issues reveals – rather surprisingly – the great extent to which Descartes's views on causation embody the two key revolutionary Humean moves that I just outlined.

Occasionalism as an Heir to Aristotelianism

To set up our discussion of Descartes's views on causation, let's look briefly at the transition between an Aristotelian approach to causation and the kind of occasionalism one finds in Malebranche in particular. As we saw, on the Aristotelian approach, forms are a locus of causal explanation. With the advent of mechanistic science, such causal explanations were rejected as illegitimate. It then became hard to see how finite objects – stripped of their Aristotelian forms – could genuinely explain changes in other finite objects. One response to these qualms – a response that took the concern with explanation especially seriously – was Malebranche's occasionalism. If – as the Aristotelians were – one is looking for something that could genuinely explain change, and if finite objects bereft of their forms and causal power could no longer play this role, then it seemed natural to turn to God as *the* causal agent.

Malebranche is abetted in this move to God by a particularly strong understanding of the nature of causal connection. For Malebranche, causal connections are conceptual connections: from the concept of the cause, one can deduce that the effect exists. As Malebranche puts the point, “A true cause, as I understand it [*c'est ainsi que je l'etends*], is one such that the mind perceives a necessary connection between it and its effect” (Malebranche 1980: 450).

Although Malebranche himself does not present the matter this way, such a view can be seen as flowing from the Principle of Sufficient Reason, the principle that all facts

have an explanation. If A causes B, then there must be a connection of some kind between them. But then the PSR requires that there be an explanation of the fact that such a connection holds. Conceptual connection between A and B provides just such an explanation, and if the concepts of A and B are connected, then (Malebranche thought) the mind can perceive the connection between A and B by grasping these concepts. Further, without such a conceptual connection, there would seem to be no explanation of what makes the connection between A and B hold and the connection between A and B would seem to be a brute, inexplicable fact. One can thus see a rationalist commitment to explanation as undergirding the definition of cause in terms of conceptual connection. In this light it is not surprising that even *non-occasionalists* who have a commitment to a strong version of the Principle of Sufficient Reason – philosophers such as Spinoza and Leibniz – are also committed to seeing causation as conceptual connection. Spinoza and Leibniz avoid occasionalism because, unlike Malebranche, they are willing to see conceptual connections in the world of finite objects. Because Malebranche holds that only the will of an infinite being is such that other things necessarily follow from it, the divine will can be seen as the only genuine cause. Finite objects at most provide occasions for God to exercise his will; they do no causal work of their own.

Malebranche's appeal to causation as a kind of conceptual connection takes the notion of causation as explanation in a direction that Aristotelian philosophers tend not to take it. Nonetheless, both Malebranche and the typical Aristotelians are actuated by the view that causes – taken on their own – explain their effects. Of course, not all occasionalists insist, as Malebranche does, on a conceptual connection between cause and effect, and such philosophers may correspondingly have less of a commitment to the PSR. However, even those who do not are motivated by a concern with intelligibility: because finite objects lack the forms that could ground a genuine causal explanation, the appeal is made to God whose activity makes changes intelligible.

Because of this shared commitment to seeing causes as making effects intelligible, the occasionalists can be seen as among the heirs to the Aristotelian tradition, despite the considerable differences between these two approaches. This commonality and these contrasts between Aristotelianism and occasionalism give us a good background in terms of which to understand Descartes's views on causation. I will argue that, while Descartes does reject forms for (most) finite objects, this rejection does not lead him to occasionalism, in part because Descartes also rejects the point of agreement between Aristotelians and occasionalists, that is, Descartes denies that causes – by themselves – render their effects intelligible.

Descartes's Causal Principle and Intelligibility

Before seeing how this denial appears in Descartes's system, it will be helpful to consider preemptively a challenge to the view that Descartes rejects this point of agreement between the Aristotelians and the occasionalists. The challenge arises from the causal principle that Descartes famously espouses in the Third Meditation. This principle might be read in such a way as to commit Descartes to the view that – in

opposition to what I have just suggested on Descartes's behalf – causes render their effects intelligible.

In the run-up to his conclusion that God exists, Descartes lays down the following requirement for a causal relation:

It is manifest by the natural light that there must be at least as much in the efficient and total cause as in the effect of that cause. For where, I ask, could the effect get its reality from, if not from the cause? And how could the cause give it to the effect unless it possessed it? It follows from this both that something cannot arise from nothing, and also that what is more perfect – that is contains in itself more reality – cannot arise from what is less perfect. . . . A stone, for example, which previously did not exist, cannot begin to exist unless it is produced by something which contains, either formally or eminently, everything to be found in the stone. (2:28; AT 7:40–1)

To understand this principle, let's try to get clearer on Descartes's notion of degrees of reality. Descartes here sets up an ontological hierarchy. At the highest level would be an infinite substance; such a substance would depend on absolutely nothing else for its existence. At the next level are finite substances which do – or at least can – depend on something else, viz. an infinite substance, but which are independent of all other things. Finally, there are modes or accidents or states of finite substances which depend on those finite substances. God would be the only example of an infinite substance. Created minds and bodies would be examples of finite substances, and particular thoughts or extended qualities would be examples of modes of finite substances. The driving force behind this classification seems to be the relative degrees of independence of the things at each level. (See especially 2:130; AT 7:185.)

Descartes's ontological hierarchy, explained in this way, is rather coarse-grained. But there are signs in Descartes of finer gradations which emerge in at least two different ways in the texts. First, Descartes indicates that the mind has more reality than the body (3:265; AT 4:292). Second, Descartes appeals to the greater or lesser intricacy (*artificium*) of certain bodies which, therefore, have more or less reality (2:10–11, 75–6; AT 7:14–15, 103, 104; *Principles* I, 17). Neither of these ways of allowing for a richer hierarchy is fully developed.

Understood in terms of this ontological hierarchy, Descartes's causal principle is simply the claim that something higher on the scale of reality cannot be caused by something lower on the scale of reality. This is what Descartes's claim, at the beginning of the Third Meditation passage – that there must be at least as much reality in the cause as in the effect – suggests. However, there is an apparently more robust reading of this principle that is also suggested by the texts. Descartes says that all the reality in the effect must be found in the cause; as Descartes puts the point in the Second Replies: “whatever reality or perfection there is in a thing is present either formally or eminently in its first and adequate cause” (2:126; AT 7:165; see also 2:55; AT 7:79). The less robust reading of the principle merely requires that nothing higher on the scale of reality can be caused by something lower. The more robust reading specifies that not just any thing with a higher degree of reality would be eligible to cause a given effect. The cause must be a higher thing that contains the very same reality as the effect contains. The cause can contain the reality of the effect in one of two ways: either formally or eminently. The cause contains the reality of the effect formally just in case the reality

of the effect exists in the cause in just the way it exists in the effect. If a motion in one body were to cause motion in another body, this would be a case of formal containment because the same kind of feature – motion – is found in both cause and effect. The cause contains the reality of the effect eminently when the same reality is present in the cause in a higher form. Descartes gives the example of God who is not himself extended creating bodies which are.

Why does Descartes accept this causal principle? He seems to regard it as a self-evident truth equivalent, he says, to the claim that nothing comes from nothing. One can see Descartes's point here as turning on a notion of explicability: if there were reality in the effect that was not already contained in some form in the cause, then one could ask, where did this additional reality come from? It might seem as if the presence of this additional reality cries out for explanation. But in this case no explanation would be available. Descartes makes this point in the Second Replies:

If we admit that there is something in the effect that was not previously present in the cause, we shall also have to admit that this something was produced by nothing. (2:97; AT 7:135)

That Descartes finds such a scenario troubling indicates that he is invoking a version of the Principle of Sufficient Reason, i.e., the principle that there is for each thing that exists a reason that it exists (Broughton 2002: 155–60).

The fact that in his causal principle Descartes may be relying on a version of the Principle of Sufficient Reason, on the notion of explanation, may seem to indicate that Descartes does see causes as explaining their effects. But this is not so. The causal principle merely states that *given that* one thing causes another, the reality of these things must be correlated in a certain way: the reality of the first thing must be at least as great as that of the second thing, or the reality of the second thing must somehow be contained in the first. However, the fact that this correlation obtains does not by itself render the other thing intelligible. For Descartes, that the cause has a certain (degree of) reality does help to explain why the effect has a certain (degree of) reality. But this explanation takes place against the background of an assumed causal relation. Without presupposing that there is such a causal relation, can one see simply by considering A – the thing that is in fact the cause – and by considering what reality it has, that B – the thing that is in fact the effect – exists? Nothing about the causal principle tells us what it is about one thing that *makes* another thing exist; nothing about the causal principle dictates that one thing – considered on its own – enables us to see another coming. So while Descartes's causal principle does manifest an admirable concern that there not be inexplicable causal relations, the principle does not commit Descartes to the view that certain things – considered on their own – explain other things.

Body-Body Causation

Let's turn to three central cases of causation in each of which we will find evidence for the view that, for Descartes, causes do not, by themselves, render their effects

intelligible and for the view that Descartes does not adopt an occasionalist account of causation in the realm of finite objects. I will focus in this section on body-body causation and then examine interaction between minds and bodies in the next section.

The case for the occasionalist reading of Descartes's account of apparent body-body causation is straightforward and powerful. As a good mechanist, Descartes denies that bodies have forms in the Aristotelian sense; instead the only features of bodies are those of extension and motion (see *Principles* II, 64). Because Cartesian bodies are so austere, there is nothing to play the role of explaining change in the physical world that was played by Aristotelian forms and so, on this reading, bodies do not cause changes in other bodies. Because Descartes sees all changes in bodies as a function of the motion of bodies (see *Principles* II, 23), Descartes's point here is, more specifically, that bodies do not cause changes in motion in other bodies.

What, then, does cause changes in motion? On the occasionalist reading, Descartes's answer is clear: God and God alone. Descartes does say when explicitly taking up the topic of the causes of motion that God is the "universal and primary" cause of motion. Descartes also calls God the "general" cause of motion and distinguishes this cause from the particular causes "which produce in an individual piece of matter some motion which it previously lacked" (*Principles* II, 36). God is the general cause of motion in the following sense: when God created matter, he also caused in it a certain quantity of motion. Because God is immutable in his activity, he must continuously act so as to maintain the same quantity of motion that he initially imparted to the material world. Descartes says in *Principles* II, 36:

In the beginning he created matter, along with its motion and rest; and now, merely by his regular concurrence, he preserves the same amount of motion and rest in the material universe as he put there in the beginning. . . . God moved the parts of matter in different ways when he first created them, and he now preserves all this matter in the same way, and by the same process by which he originally created it; and it follows from what we have said that this fact alone makes it most reasonable to think that God likewise always preserves the same quantity of motion in matter. (Trans. alt.)

Thus we know from God's immutability that the same quantity of motion is always preserved in the material world. But merely by knowing that God acts so as to preserve the quantity of motion in the material universe as a whole, we do not yet know how motion is distributed among particular bodies. That is, Descartes has not yet specified the particular causes of motion, the causes that are responsible for changes in "an individual piece of matter."

It might seem natural to think that bodies themselves would be the particular causes of motions. But when he has a chance to specify the particular causes of motion, Descartes goes out of his way to say that these causes are the laws of nature – laws that derive from God's immutable activity as described in the principle concerning the conservation of motion in general. Thus, for Descartes, because of God's immutability, particular things tend to remain in the same state, the motion of each body has a tendency to be rectilinear, and there are certain rules governing changes of motion when two bodies collide. The derivation of these laws from God's immutability is problematic to say the least, but the relevant point for our purposes is that God's activity seems to

be directly responsible for the motion of bodies by imparting motion to the material world in a regular fashion. (See Garber 1993: 14; Hatfield 1979. See also 3:381; AT 5:404.)

Given this role for God in the production of particular motions, what does Descartes say concerning the causal activity of bodies themselves? On the occasionalist reading of Descartes, because of God's role in the causation of particular motions, it follows that, for Descartes, bodies themselves are not causes of motion. God and the laws by which he acts are the only causes of motion in the world (with the possible exception of motion caused by finite minds – a point to which I shall return in the next section). So, on this reading, when body A collides with body B, B's motion is caused not by A, but rather is caused by God, who impels B in accordance with God's immutable activity. As Descartes says to More, "matter is impelled by God preserving the same amount of motion or transfer in it as he placed in it at the beginning" (3:381; AT 5:404; trans. alt.).

I believe that Garber and others are right to read these texts as showing that God directly causes motion, or at least I think that these interpreters have made a very strong case for reading the texts this way. But I think that the occasionalist interpreters are wrong to conclude from these claims about God's causation of motion that, therefore, for Descartes, bodies do not cause motion. Instead, for Descartes, bodies do cause motion, despite – or, rather, as we will see, *because of* – God's causation of motion.

To establish this point, it is important to make clear one way in which I do *not* argue that Descartes believes that bodies cause motion. One may challenge the occasionalist reading by noting that there are a number of passages in which Descartes does seem to say or imply – in contradiction to the occasionalist reading – that bodies do cause motion (see, for example, 3:330; AT 5:135; *Principles* II, 22, 33). But these passages are not at all conclusive. For, as Garber and Hatfield take pains to make clear, to determine what Descartes's official views on the causation of motion are, one must look to passages in which he takes up this topic explicitly. It may well be that in other passages where he is not concerned to pin down his account of the cause of motion, he speaks loosely. Yes, he seems to attribute causal power to bodies in some passages. But, for the occasionalist interpreter of Descartes, if we consider those passages in which Descartes is careful to spell out his thinking about motion – as in that stretch of Part Two of the *Principles* beginning with §36 where he says that it is time to look at the causes of motion – we will see that Descartes is careful to assign the causal activity to God and not to bodies.

This methodological point is unobjectionable, and it helps us to appreciate the much more significant threat to the occasionalist reading that is posed by those places where Descartes says or implies that bodies are causes and does so in those very contexts where he is concerned to give his official account of causation in the world of bodies. There are at least two telling passages. First, in *Principles* II, 40, after stating his third law of motion, which specifies the changes in motion that bodies undergo upon impact, Descartes says:

And all the particular causes of changes which occur in bodies are covered by this third law, at least those that are themselves corporeal.

It is clear on linguistic and other grounds that by “those that are themselves corporeal,” Descartes means those *causes* that are themselves corporeal. This understanding of the passage is incompatible with an occasionalist interpretation of Descartes, in light of the fact that in this context he is concerned to give his official account of causation in the material realm.

The second telling passage also comes from the official account of the causes of motion in Part Two of the *Principles*. In *Principles* II, 37, Descartes articulates his first law of motion: “each thing, insofar as it is simple and undivided, always remains in the same state, as far as it can, and never changes except as a result of external causes (*causis externis*).” As the rest of the discussion makes clear, among the external causes that can alter the motion of a body are other bodies. Here too Descartes speaks in a way incompatible with an occasionalist reading. (For a fuller discussion, see Della Rocca 1999.)

Thus we cannot take Descartes’s claim about God’s causation of motion as indicating that Descartes denies that bodies also may legitimately be said to cause motion. For Descartes, God’s role in causing motion is, contrary to the occasionalist interpretation, somehow compatible with bodies also playing a legitimate role in the causation of motion.

In fact, Descartes explicitly says in *Principles* II, 43 that the causal activity of bodies with regard to motion *consists in* the relation that bodies have to the activity of God in causing motion: “This power consists [*consistat*] simply in the fact that everything tends, so far as it can, to persist in the same state, as laid down in our first law.” This tendency on the part of bodies to persist in the same state is, as Descartes specifies in *Principles* II, 37, simply a function of God’s immutable activity of causing motion. So Descartes’s view is that one body’s causation of motion in another body consists in God’s causation of that very same motion.

It is difficult to see how it can be coherent to say, as Descartes does here, that the action of bodies with regard to the motion of other bodies is nothing but God’s moving those other bodies. I will return to this worry about incoherence presently, but first I want to explain how the fact that Descartes sees bodies as causally active in this way shows that Descartes is taking the first Humean step, that he is going against both Aristotelians and occasionalists by denying that causes make their effects intelligible.

For Descartes, as we have just seen, body A does cause a change in the motion of B. But there’s nothing about A and its motion, considered in themselves, that enables us to see the effect coming or that explains that effect. Rather, the explanation of B’s motion is in terms of God’s activity. However, despite this lack of an explanatory connection between A and B’s motion, A nonetheless *causes* B’s motion. In this and in all other cases of body-body causation, we have causation without intelligibility through the cause alone.

In denying that bodies that cause motion make such motion intelligible, Descartes rejects the key point of agreement that makes the occasionalists heirs to the Aristotelian tradition. So fundamentally Descartes is neither an occasionalist about body-body causation nor is he in line with the Aristotelian tradition. Of course, given that Descartes rejects occasionalism and sees bodies as causes, one may be able to devise a sense in which Descartes, like the Aristotelians, sees God as merely conserving bodies in

existence or as concurring with the actions of bodies (see Hattab 2000; Pessin 2003; Schmaltz forthcoming; Clatterbaugh 1999: 59). But this assimilation of Descartes to the Aristotelians threatens to obscure Descartes's fundamental disagreement with both occasionalists and Aristotelians and threatens to obscure his corresponding agreement with Hume. In Descartes's treatment of body-body causation, he thus leap-frogs over the occasionalists and espouses a conception of causation – causation without intelligibility – that was to become established only much later with Hume. In a way, Descartes is pulling a reverse Shoemaker: Descartes's ahead-of-his-time move here toward Hume and away from a more rationalist account of causation is the mirror image of Shoemaker's "reactionary" move to a pre-Humean, more rationalist view of causation.

If we return to the potential incoherence that I identified in Descartes's position, we can see that he also takes a version of what I called earlier the second Humean step. The potential incoherence stems from the fact that Descartes sees bodies as causes of motion despite the fact that God impels the body that is struck by another body. How could bodies have any genuine causal role to play, if God plays this causal role? Certainly, if other *bodies* besides A moved body B, then – barring some kind of overdetermination (which Descartes would certainly rule out in the case of God) – we would be hard-pressed to see A as also a genuine cause of the motion of B. Why doesn't a similar line of reasoning show that, given God's causation, body A is not a genuine cause of B's motion?

Descartes would answer this question by insisting that God's status is exceptional and so the rules that apply to the activity of finite objects do not apply to God. If finite objects – other than A – cause B's motion, then A cannot be seen as causing B's motion. But when the object other than A that causes B's motion is God, then all bets are off. We're playing by different rules, and so God can be the cause of B's motion after all (without conflicting with A's causation of that very same motion). Because of this exceptional status for God's activity, that activity is, for Descartes, incomprehensible.

This appeal to God's incomprehensibility and exceptionality appears in a number of other areas in Descartes's philosophy, and the pervasiveness of this phenomenon in Descartes makes it more plausible to see it as at work here too in his account of causation. Thus, to take one particularly central example, Descartes believes that eternal truths such as " $2 + 2 = 4$ " are genuinely necessary despite the fact that God could have made them otherwise (see, for example, 2:261, 291; AT 7:380, 432; 3:235; AT 4:118). For Descartes, we cannot see how these two claims are compatible, but precisely because God and his activity are incomprehensible, we should not expect to see how to reconcile these claims. (Descartes explicitly appeals to God's incomprehensibility in this connection at 2:294; AT 7:436; 3:23, 235; AT 1:146, AT 4:118.) Most philosophers would hold that if " $2 + 2 = 4$ " is to be genuinely necessary, God's will cannot have control over the truth of that claim. So, in affirming that " $2 + 2 = 4$ " is necessary, such philosophers would be committed to denying that God's will can accomplish certain things. But, for Descartes, we can allow genuine necessity for truths such as " $2 + 2 = 4$ " while also giving full scope to God's will. In other words, for Descartes, we don't have to worry that in affirming the necessity

of certain truths we are stepping on God's toes. For Descartes, God can take care of himself.

Similarly in the case of freedom, Descartes holds that our actions are free and undetermined despite the fact God determines all things. These claims may seem impossible to reconcile, yet they are both true. Descartes's claim is simply that how they are both true is incomprehensible (see especially *Principles* I, 41, and 3:277; AT 4:333). Here again we do not have to worry about stepping on God's toes. The freedom of our actions and the fact that our actions are undetermined do not in any way preclude God's action of determining all things. Once again, God can take care of himself; we do not have to worry that in preserving an important claim about finite things we are invading God's territory. (For other similar cases, see Della Rocca 2003.)

And so too in causation. Just as God's activity does not threaten necessity and freedom (though it might be thought to threaten these things), so too God's activity of causing motion does not – perhaps surprisingly – threaten the genuine causation of motion in bodies by other bodies. Or – to put this point another way – in affirming that bodies cause motion in other bodies, we are not, for Descartes, thereby limiting the kinds of things God can do with regard to such motion.

By contrast, for the occasionalist, any causal role for bodies would limit God's causal role unacceptably, and so the occasionalists conclude that bodies do not play a causal role. The Aristotelians tend to be more sanguine than the occasionalists about the prospects for coherently giving bodies a genuine causal role compatibly with maintaining the proper level of activity for God. But, like the occasionalists, they too are worried about stepping on God's toes. Again, however, for Descartes, there is no need to worry: God can take care of himself.

When it comes to the causation of motion, it's almost as if, for Descartes, God plays no role at all. Of course, he does play a major role, but precisely because God's activity is incomprehensible and exceptional, we can make our claims about bodies as causing motion without being concerned about the implications of such claims for God's activity. Similarly God's activity is in a way irrelevant to claims of necessity and freedom as it applies to finite things. By kicking God upstairs when it comes to the causation of motion, by giving us the freedom not to worry about how God fits into our metaphysics, Descartes is, in a way, making the second Humean move. Hume envisioned an account of causation in which God does not play any metaphysical role. Descartes opens up the same possibility by allowing us not to worry about fitting God into our metaphysical system, by allowing us to treat God as irrelevant when it comes to ascribing causality to finite objects. Of course, Descartes, unlike Hume, puts the point about God's irrelevance in the context of Descartes's overall views on God's exceptional status and the incomprehensibility of God's activity. From Hume's point of view, even to appeal to an incomprehensible and exceptional God is to appeal to God too much. While Descartes wants to kick God upstairs, Hume seems to want to kick him off the premises entirely. But the key point is the same in each philosopher: we can proceed as if God is irrelevant to the truth of claims about finite objects as causes. And, again, that this is a strand in Descartes's thinking about causation is supported by his overall and systematic views on God's incomprehensible activity.

Causation Between Minds and Bodies

We can see evidence that Descartes also makes the two Humean moves in both the case of body-mind interaction (i.e., cases in which a body acts on a mind) and in the case of mind-body interaction. But before reaching this conclusion, we need to establish that Descartes accepts that there are these two kinds of interaction.

One challenge to seeing Descartes as accepting causation between minds and bodies stems from his view that the mind and body have radically different natures. The mind is, by its nature, thinking and not extended, and the body is, by its nature, extended and not thinking. More specifically, the principal attribute of the mind is thought and thus all the more particular properties of the mind presuppose or refer to thought (*Principles* I, 53; similar claims hold for the body and its principal attribute, extension). For Descartes, there is no conceptual connection between thought and extension: one can conceive that a mind exists without thereby conceiving that a body exists and one can conceive that a body exists without thereby conceiving that a mind exists. Further, simply from that fact that a mind has certain mental properties, one cannot infer that it also has certain physical properties, and vice versa for body (see 1:298; AT 8b:349–50).

Many have thought that, because of the radical dissimilarity between the mind and the body, there is something illegitimate about causal relations between them. Certainly some later Cartesians and others pressed this objection. But there is no evidence that Descartes accepts or would accept this objection. In fact, he explicitly rejects it in a letter to Clerselier (2:275; AT 7:213). It might be thought, however, that Descartes's causal principle rules out heterogeneous causation. But while the causal principle, as we have seen, does place some constraints on causal relations, it does not require that causes and effects be of similar kinds. Descartes requires at most only that causes contain the same reality as their effects, and he explicitly allows that this reality need not be in the same form in the cause as in the effect: the cause may contain the reality of the effect eminently, in a higher form. This would allow for dissimilar things to interact, at least in cases in which the cause has more reality than the effect. However, because Descartes may believe that bodies have less reality than minds, there may still be a difficulty – stemming from the causal principle – with body-mind interaction in particular. We will turn to this issue shortly.

Not only does Descartes not see heterogeneity as precluding causation between mind and body, but it is also clear that he accepts causation in these cases. Descartes says explicitly that minds cause changes in bodies and he says this even in passages where he is officially taking up the topic of causation (see, for example, 3:358, 371, 381; AT 5:222, 347, 403–4). Even Garber, who otherwise sees Descartes as leaning toward occasionalism, agrees with this reading.

For Garber, it is significant that the only substantial form Descartes recognizes in the world of finite objects is the human soul, which Descartes says is the substantial form of the man or human being (2:246; AT 7:356; 3:207, 208, 279; AT 3:503, 505; AT 4:346). It is, for Garber, because the mind is a substantial form that he believes that Descartes allows the human mind to count as a genuine cause of bodily change (see Garber 1992: 276). Garber may be right that Descartes's regarding the mind as a substantial form may be connected with his thinking that the mind is causally active.

But to the extent that Garber is suggesting that for Descartes a substantial form is required in order for a finite substance to have causal power, I believe that Garber is mistaken: as we have seen, there is ample evidence that, for Descartes, bodies – bereft of substantial forms – are nonetheless causal agents.

The case for seeing Descartes as accepting body-mind causation is more complicated, but nonetheless clear. As we have seen, one who regards Descartes as an occasionalist in the body-body case thinks that, because bodies have been stripped of forms, they are unable to cause changes in bodies and that God must step in to do this causal work. Similarly, someone might argue that because bodies have no forms, they are also unable to cause mental changes (Garber 1993: 20). While Garber does not think that it is clear that Descartes embraced this view of body-mind causation, Garber does find suggestions that Descartes was moving toward this view in the late 1640s, suggestions stemming from the increasing use of less obviously causal and more apparently occasionalistic terminology in the *Principles* and in the French translation of the *Principles* (which Descartes approved).

The first and most important point to make in response is that this line of thought is motivated by the claim that because, for Descartes, bodies are merely extended, without forms, and thus cannot render changes in motion intelligible, they also cannot cause changes in minds. But again this presupposition is false: Descartes, as we have seen, does regard bodies as causing changes in other bodies, and he does not think that the lack of forms prevents bodies from having causal power. The second point is that, though it is suggestive that Descartes employs the term “occasion” and other non-causal terminology in some passages, there is – as Garber recognizes – no indication that he is using these terms in the technical, explicitly non-causal sense in which the later occasionalists were to use them.

A possible reason for thinking that bodies do not cause changes in minds comes from Descartes’s Third Meditation causal principle. As we saw, according to this principle, the cause must contain, formally or eminently, whatever reality the effect has, i.e., the cause must contain this reality in the same form or in a higher, more excellent form. It seems clear that, for Descartes, given the radical dissimilarity between mind and body, the reality of a mental effect cannot be contained in a body formally. But it also seems that a mental reality cannot be contained in a body eminently, for this would require that the body, as Margaret Wilson puts it, “contains perfections more excellent than mental modes” (Wilson 1999: 46). But this, as Wilson points out, is implausible, given that Descartes explicitly regards the mind as “much nobler than the body” (3:265; AT 4:292). However, if the reality of a mental change cannot be contained in a body either formally or eminently, then it follows that a body cannot be a cause of mental change.

One way out of this difficulty is, as Wilson suggests, to draw a distinction between the objective reality of an idea or mental state – i.e., its representational content – and its formal reality, its status as a state or mode of mind. Perhaps the body cannot contain the reality of modes of thought formally speaking. Indeed, Descartes indicates as much in the Third Meditation when he says that considered simply as modes of thinking, i.e., abstracting from their content or objective reality, ideas proceed from my mind (2:27–8; AT 7:40). However, although bodies don’t contain the formal reality of ideas and thus don’t cause the ideas considered formally, bodies can formally contain the

reality that ideas, in particular ideas of bodies, have objectively. Thus bodies would be eligible to cause ideas of bodies considered objectively. However, while bodies may contain formally what ideas of size, shape, and motion may contain objectively, it's more difficult to see how bodies can contain formally what ideas of color, taste, and sound contain objectively since those qualities do not characterize bodies. Wilson plausibly suggests that, for Descartes, since such ideas "exhibit so little reality" (2:30; AT 7:44), such reality is contained eminently in bodies.

Do mental causes of physical effects or physical causes of mental effects make these effects intelligible? Descartes seems to say that they do not. Precisely because there is no conceptual connection between the mental and the physical, any causal connection between minds and bodies would have to be set up by God's will. (Actually, given Descartes's doctrine of the creation of the eternal truths, even conceptual connections are somehow set up by God's will. But in his discussion of mind-body interaction in the Sixth Meditation and elsewhere, Descartes is largely bracketing his radical claims about God's creation of the eternal truths.) And, Descartes says, God sets these causal relations up in such a way as to be of most benefit to the well-being of the body to which the mind is somehow united:

God could have made the nature of man such that this particular motion in the brain indicated something else to the mind; it might, for example, have made the mind aware of the actual motion occurring in the brain, or in the foot, or in any of the intermediate regions; or it might have indicated something else entirely. But there is nothing else which would have been so conducive to the continued well-being of the body. (2:60–1; AT 7:88)

This example concerns body-mind causation, but given the conceptual separation between thought and extension, there is a similar role for God's will to play in setting up mind-body causation. (This is suggested by, for example, *Passions* I, 44.)

Here we can see that, for Descartes, there is nothing about a physical change that, considered on its own, dictates a certain mental change; we cannot on the basis of a physical change alone see a certain mental change coming. Thus the physical change by itself doesn't explain the mental change. What is needed to explain the mental change is a further factor – viz. the will of God which makes it the case that a certain physical change causes a certain mental change. (Similar points would apply to mind-body causation.) So, as in the case of body-body causation, we see that, for Descartes, physical causes don't by themselves make their mental effects intelligible (and vice versa). Thus, in the arena of causation between the mental and physical, Descartes also makes the first Humean step.

Let's return to the second Humean move in order to see if it too appears in the case of causal relations between the mental and the physical. Recall that this move is the elimination of God from one's account of causation. In the case of body-body causation, Descartes does not eliminate God from his account of causation, but Descartes approaches the second Humean move because Descartes enables us to proceed as if God is irrelevant to our claims that attribute causation to finite objects. For Descartes, we don't have to worry about stepping on God's toes when it comes to seeing one body as causing motion in another body.

Is there a similar insouciance in Descartes about the role of God when it comes to mind-body and body-mind causation? Descartes's views concerning freedom suggest that he does take something like the second Humean step in at least some cases of mind-body causal relations. Recall that for Descartes our actions are free and undetermined, even though in, perhaps, another sense of "determine" God determines these actions. The freedom and lack of determination of our free actions – including presumably our free actions of moving our bodies – do not interfere with God's determination of those very same actions. One might think that our having this freedom would stand in the way of God's power over these actions; but it does not. We can go ahead and attribute robust freedom to our actions without having to worry about whether in doing so we place improper limits on God's power.

A similar point – but one that applies to causation by finite objects in general – is suggested by an important letter to Elizabeth on October 6, 1645. There Descartes says that anything in the world of finite objects – whether caused freely by the human mind or not – is such that God is its total cause. Descartes says:

I must say at once that all the reasons that prove that God exists and is the first and immutable cause of all the effects that do not depend on human free will prove similarly, I think, that he is also the cause of all the effects that do so depend. For the only way to prove that he exists is to consider him as a supremely perfect being; and he would not be supremely perfect if anything could happen in the world without coming entirely from him. . . . God is the universal cause of everything in such a way as to be also the total cause of everything. (3:272; AT 4:313–14)

It seems that attributing causal power to finite things does not threaten God's activity. In this way, we can proceed with ascribing causal power to finite objects as if God plays no role and without worrying about stepping on God's toes. For Descartes, as we have seen, God can take care of himself.

Here again, we can see that, just as Shoemaker abandoned his contemporaries and immediate predecessors to take up his "reactionary" pre-Humean position, so too Descartes steps away from his Aristotelian predecessors and occasionalist successors to make one of his revolutionary Humean moves concerning causation.

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Chapter 15

Descartes on Substance

VERE CHAPPELL

The concept of substance has played a central role in the metaphysical theories of western philosophers. Aristotle was the first to give substance this privileged position, and his lead was followed by the majority of the Scholastic philosophers whose thinking dominated the high Middle Ages. Descartes was educated in the Scholastic tradition; he incorporated much of their doctrine and especially their terminology in his own metaphysical writings. But though he speaks about substance in the *Meditations on First Philosophy*, he gives no distinctive account of it: the views he expresses differ but little from those of his Scholastic forbears. Later, in his *Replies to the Objections* brought against the *Meditations*, especially the fourth set in response to Arnauld, Descartes develops some doctrines that go against the Scholastic position, but he still provides no systematic account of substance. Such an account does appear after that, however, in the *Principles of Philosophy*, and in this work Descartes reaches further novel conclusions about substance.

In this chapter I shall chart the development of Descartes's conception of substance, from its first appearance in the *Meditations*, through its elaboration in the *Replies to Objections*, to the systematic treatment it receives in the context of the comprehensive scheme of ontology he outlines in the *Principles*.

Descartes's Uses of the Word "Substance"

In his scientific works, Descartes uses the word "substance" to mean "matter" – not Aristotelian prime matter, the existence of which he denies, but the specific material of which a body is composed. Thus he speaks of the substance of the brain (1:100; AT 11:129) and the substance of "these heavens and stars" (1:133; AT 6:133). In this use, "substance" does not stand for an individual thing with its own identity; it stands for a component of such a thing, the stuff of which it is made; and it borrows its identity, so to speak, from that thing.

In Descartes's metaphysical writings, however, beginning with the *Discourse*, "substance" is mostly used to designate individual things: this or that substance, or these substances. When commentators speak of Descartes's conception of substance it is mainly this use of the word they have in mind. Their topic, therefore, is Descartes's

conception of an individual substance or substances, not of the substance of something. For the most part, that will be my topic in this chapter also.

I say “for the most part” because there is another use of the word “substance” in the *Meditations* and *Principles*, in addition to these two. In this other use, “substance” designates not an individual substance but something attributed to individual substances. I take note of some instances of this use below, in my discussion of Descartes’s treatment of substance in the *Principles*.

Individual Substances in the *Meditations* and *Objections and Replies*

What then is an individual substance for Descartes? His first characterization of it is given in an appositive phrase following a reference to substance in the Third Meditation: a substance is “a thing able to exist through itself [*per se*]” (2:30; AT 7:44). What this means may not be clear, however, and Descartes does nothing to explain it at the time. (Cottingham’s English translation uses different words, but makes Descartes’s meaning no clearer: a substance is “a thing capable of existing independently.” Independently of what, one wants to know, and in what manner?) What Descartes does instead is provide some examples of substances. He says that a stone is a substance, and also that he himself is one. By “himself” here he means “himself insofar as he is a thinking thing,” which is to say, a mind, for that is all that he knows himself to be at this stage of the *Meditations*. (In the Sixth Meditation, after claiming to have proved that there are bodies in the world, Descartes identifies himself with a composite being, consisting of both a body and a mind: he calls this “my whole self [*me totum*]”: 2:56; AT 7:81.) The stone, he says, is “a thing that is extended and does not think”: this is what he elsewhere calls a corporeal substance or body. He himself, that is, his mind, is a thing that thinks and is not extended. Thus, these two substances “differ greatly” from one another, “but they seem to agree in that both are substances.” A more Aristotelian way of putting this point would be to say that “body” or “extended substance” and “mind” or “thinking substance” are names of two species within a single genus called “substance,” so that the difference between an individual body and an individual mind is a difference of kind. Descartes, however, does not usually speak in this Aristotelian way.

If substances are things that exist *per se*, then the alternative way of existing is, presumably, *per aliud*, through something else, though Descartes does not use this expression. So what are the things that exist in this other way? At the end of the Third Meditation paragraph I have been quoting from, Descartes distinguishes “various thoughts [*cogitationes*]” that he has from himself, that is, from the substance he is; and he also distinguishes “extension, shape, position, and motion” from the corporeal substances – the stone, for example – to which they belong. These latter things, he says, “are merely modes of a substance,” and though he doesn’t say so, it is reasonable to think that he regards my different thoughts as modes of a substance as well. To be sure, there are differences between modes such as thoughts and modes such as extension, shape, position, and motion, other than the fact that they belong to different kinds of substance. Thoughts are determinate particular events, which occur at certain times and don’t last very long; whereas extension and the rest are “determinable” features

(as some philosophers have called them) which may come and go to some degree but which generally persist through extended periods of time. Determinate instances of some of these determinable features – particular positions and shapes, for example – are also persisting features, although particular motions, like thoughts, are events. Despite these differences, however, all of these entities are modes, as Descartes uses the word.

(There is a terminological matter here that needs to be noted. In his earlier metaphysical works – *Meditations* and *Replies to Objections* – Descartes uses the terms “mode,” “attribute,” “quality,” “property,” “affection,” and “accident” more or less interchangeably and thus rather loosely. In the *Principles*, however, he stipulates different meanings for some of these terms, giving each a special, restricted sense. I shall ignore these special senses, however, and use the phrase “modes or attributes” to designate all such things indiscriminately, without attention to the different types that Descartes later distinguishes.)

It may be the case, then, that modes or attributes are the entities, or are among the entities, from which Descartes means to distinguish substances by characterizing them as things that exist through themselves. That this is his position is confirmed in a passage in the Second Replies, written shortly after the *Meditations* was finished. In this passage he defines a substance as “any thing which something that we perceive is immediately in, as in a subject, or through which some such thing exists,” and he explains that among “things that we perceive” are “properties, or qualities, or attributes [*omnes res cui inest immediate, ut in subjecto, sive per quam existit aliquid quod percipimus, hoc est aliqua proprietas, sive qualitas, sive attributum, cuius realis idea in nobis est, vocatur Substantia*] (2:114; AT 7:161). (He does not include modes in this list, but that fact has no significance, since at this point he is using all of these terms equivalently.)

Hence substances for Descartes, being things that exist through themselves, are not modes or attributes, which are things that exist in and through things other than themselves, namely substances. Descartes also says that a mode exists in a substance “immediately, as in a subject” – the qualification serving, presumably, to distinguish modes from parts of a substance, which may also be said to exist in them.

Descartes and Aristotle

So far, Descartes’s account of (individual) substances looks rather like the traditional Scholastic account, based ultimately on Aristotle’s *Categories*. (Aristotle’s word for the Scholastic and Cartesian “substance” is “*ousia*.”) Aristotle distinguishes, among “things there are,” (1) those that are “said of a subject,” (2) those that are in a subject (but “not as a part”), and (3) those that are “neither in a subject nor said of a subject” (Aristotle 1963: 4; *Categories* §1:1a20). It is the things in class (3) that he says are called substances “most strictly, primarily, and most of all” (Aristotle 1963: 5; §5:2a11ff.). He subsequently refers to these as “primary substances” and distinguishes them from secondary substances, which are things contained in class (1); these are, he says, the “species” and the “genera” in which the primary substances exist, that is, to which they belong. (I shall sometimes use the word “kind” to refer to species and genera together.) The difference is that primary substances are individuals – each is “a certain ‘this,’”

and is “numerically one” – whereas kinds are universals – they are “said of many things.”

(I have divided Aristotle’s “things there are” into three groups to facilitate comparison of his views with Descartes’s. But Aristotle himself lists four divisions. The fourth of these coincides with my (3); but he subdivides my (1) into (1a) things that “are said of a subject but are not in any subject” and (1b) those that “are both said of a subject and in a subject,” and my (2) into (2a) things that “are in a subject but not said of any subject” and (2b) those that are both in a subject and said of a subject. Since (1b) and (2b) have just the same members, these two subdivisions collapse into one, and this is the third division Aristotle mentions. His first and second divisions coincide with my subdivisions (1a) and (2a), respectively.)

Aristotle then claims that all the things that are, other than primary substances, “are either said of primary substances as subjects or in them as subjects.” And he concludes that “if primary substances did not exist it would be impossible for any of [these] other things to exist” (Aristotle 1963: 6; §5:2a34ff.). In this way, these other things depend on primary substances: by definition, they are things that are either in or said of things other than themselves, hence they need such things to be in or said of in order to exist themselves; and primary substances are identified as the things that fulfill this need. Primary substances, by contrast, being neither in nor said of anything other than themselves, have no such need. They are, in this sense, independent of such things.

Descartes’s account of substances and modes or attributes as I have so far expounded it maps fairly closely on to Aristotle’s. Descartes defines a substance in pretty much the same way that Aristotle defines a primary substance, and his conception of modes or attributes is similar to Aristotle’s conception of things that are in, and consequently dependent on, substances. Furthermore, there is considerable overlap between the examples of substances the two philosophers cite. Aristotle would agree with Descartes that a stone is a primary substance, and Descartes would agree with Aristotle that an individual horse is one. Aristotle would not, of course, take a mind, nor would Descartes (I claim) take an individual man, to be a substance, but that difference is a consequence not of different conceptions of what a substance is, but rather of different conceptions of what minds and human beings are.

It is true that Descartes makes no room for the things in Aristotle’s “said-of” group, and this leaves an important lacuna in his ontology. But neither does Descartes deny that such things exist; and in the *Principles* he remedies the omission somewhat by introducing the notion of principal attributes, which (I shall maintain) are much like Aristotle’s secondary substances in nature and function.

Both Descartes’s modes or attributes and Aristotle’s things in class (1) are in substances, not as parts but (as Descartes might say) in the way that modes or attributes are wont to be in substances. (Other philosophers have said that modes and attributes “belong to” or “inhere in” or “reside in” substances.) Both philosophers make the claim that such things are dependent on substances. One facet of this dependence is expressed in Aristotle’s statement that things that are in substances could not exist if substances did not exist. But this is not the whole meaning of dependence. For it is compatible with this statement that some modes exist apart from substances as long as there are substances in which other modes exist. But Aristotle also holds, as we have seen, that all

things other than substances – all modes and attributes – either exist in or are said of substances, and this means that no such thing exists on its own, apart from a substance. Descartes takes the same view, and justifies it by appealing to the Scholastic “common notion” that “no real attribute can belong to nothing,” which is equivalent to “every real attribute must belong to something” (2:114; AT 7:161; cf. 1:210; AT 8A:25). This view is also supported by Descartes’s rejection of the Scholastic doctrine of real accidents, according to which it is possible for some modes or attributes to belong to two distinct substances in succession, moving, as it were, from the one to the other while retaining their identity. Descartes’s view, by contrast, is that no mode, once it exists in a given substance, can come to exist in a different substance without becoming a different mode. (Suppose a resting body *y* is struck by a moving body *x* with the result that *y* starts to move and *x* stops moving. This might be described as a case of motion-transfer: the same motion is transferred from the one body to the other. But Descartes would say that, strictly speaking, the motion in *x* is a distinct thing from the motion in *y*, however similar they might be and whatever the causal relation between them.) It is not clear whether Aristotle himself accepted, or would have accepted, the doctrine of real accidents, although it is unlikely that the Scholastics would have endorsed the doctrine had they not at least believed that Aristotle maintained it. (Of course, the Roman Catholic understanding of the Eucharist presupposes the doctrine of real accidents, and this gave the Scholastics a powerful additional motive for holding it.) Descartes’s position, however, clearly does rule out the possibility of one and the same mode’s existing successively in two different substances.

In any case, for both Descartes and Aristotle, there is an asymmetry in the relationship between substances and modes or attributes. No mode or attribute could exist if either some substance or other, or some particular substance, did not exist; and the implication is in both cases that the converse does not hold. But exactly what is the converse of the position that modes and attributes are dependent on substances? Surely neither philosopher would allow the possibility of a world in which there were substances but no modes or attributes at all. Nor would either agree that even a single substance could exist and not have any modes or attributes. What both do hold is that, while every mode or attribute that is truly ascribed to a substance requires the existence of some substance, or even of that particular substance, no substance requires that every one of the modes or attributes that does exist in it, must necessarily exist in it. As both Descartes and Aristotle would put it, every substance has modes or attributes that are “essential” to it, such that it could not exist if they did not, not only exist, but exist *in it* – and every substance has modes or attributes that are not essential but “accidental,” that is, such that they could be absent or disappear without affecting the existence of the subject. This is perhaps difference enough to sustain the asymmetry of the relation between substance and mode or accident.

Modes and Attributes: Tropes

In speaking of modes and attributes, especially when distinguishing those that are essential from those that are accidental, we must be careful to specify which mode or attribute we are referring to. Rationality is an essential property of men, according to

Aristotle; for Descartes, thinking is an essential property of minds, as being extended is of bodies. But there are different specific forms or varieties of thinking – willing and doubting, for example – and different specific ways of being extended – in size and in shape, for example. Descartes calls these different forms and ways “modes,” using the word in a sense different from the one I have so far employed. Like being extended in general, these different modes of extension are also essential to bodies: every body must have size and shape. But there is a further level of specificity to be reckoned with here, at least in the case of properties of extended substances. Not only do all bodies have size and shape; every body has some specific size and shape – 3 feet long and cylindrical, for example – and the things at this level too are modes or attributes of the substances they inhere in. (Philosophers have called modes such as size and shape “determinable” properties, and modes such as being 3 feet long and being cylindrical “determinate” properties: see *The Cambridge Dictionary of Philosophy*, s.v. “determinable.”) The latter properties, that is, the determinates, are not properties that are essential to bodies, however. Different bodies have different specific sizes and shapes, and the same body may take on different sizes and shapes at different times. Aristotle expresses this point in a well-known passage in the *Categories*: “A substance, while remaining numerically one and the same, is able to receive contraries. For example, an individual man – one and the same – becomes pale at one time and dark at another, and hot and cold, and bad and good” (Aristotle 1963: 11; §5: 4a10).

Care must also be taken to observe a further distinction when speaking of modes or attributes, Aristotelian as well as Cartesian. Being extended is a universal because it is a species that resides “in many things”; so is size or having some size or other; and so is having a specific size: 3 feet long. But although being 3 feet long is more specific than having size, and more specific still than being extended, it too is a universal, a species that many different substances can share: they all can have the same size, can all be 3 feet long, indeed 3 feet long exactly. But in addition to these universal extension-related modes or attributes, we also must recognize a further member of the same family, namely, a particular instance of being 3 feet long. Suppose the ruler hanging by the workbench in my basement (call it “r”) has the property of being 3 feet long (it is in fact a yardstick). Then this property, precisely designated as “r’s being 3 feet long,” belongs to r just as much as r’s length and r’s extension do, although it, unlike them, is not a universal, but a particular thing, as particular as its possessor r is. Furthermore, this property depends for its existence, not merely on some substance or other, but on r in particular. If r stops existing, then so does this property stop existing, and the latter cannot exist apart from r. The converse of this last proposition, that r cannot exist without being 3 feet long, does not hold, however, for at least some such properties need not be essential (although some philosophers – perhaps Leibniz is one – have maintained that all properties of a substance, particular as well as general, are essential properties).

Particular properties, such as my ruler’s being 3 feet long, have been called “tropes” (or “property-instances,” or “abstract particulars”: see *The Cambridge Dictionary of Philosophy*, s.v. “trope”), and that is the term that I shall use for them henceforth. Not all philosophers have recognized the existence of tropes; some hold that a property (or mode or attribute or quality) must be a universal. But there is no doubt that Aristotle believes in them. Thus he says that “things that are individual and numerically one

are, without exception, not said of any subject, but there is nothing to prevent some of them from being in a subject.” Socrates’ “individual knowledge-of-grammar,” for example, “is one of the things in a subject” (Aristotle 1963: 4; §2:1a26ff.). Aristotle does not think that everything that is in a subject is a trope, however, for he says that knowledge may be “in a subject, the soul [of Socrates, for one],” but it “is also said of a subject, ‘knowledge-of-grammar’” (Aristotle 1963: 4; §2:1a30ff.). Note that, in such cases, the subject the thing is said of is a different subject from the one it is in.

How about Descartes? Does he believe in tropes? The answer to this question is controversial. I, for one, believe that Descartes does acknowledge tropes, and that the “color, shape, and size” of the (piece of) wax he considers in the Second Meditation, for example, quite obviously are tropes. So are the particular thoughts that occur in minds, and the particular motions that bodies engage in.

Jonathan Bennett, however, disagrees. Bennett claims that some of Descartes’s views about causation could be made metaphysically “respectable” if – and only if – causation were regarded as “the transfer of tropes.” But “Descartes . . . rejects tropes in all their roles,” according to Bennett, because tropes as he conceives them are real accidents, and real accidents are impossible: the very idea thereof entails a contradiction (Bennett 2001, 1: 90–5). But Bennett assumes that a Cartesian trope “could migrate from one substance to another” and even exist “without having any substance to inhere in” (p. 92). As I read Descartes, however, he is not committed to, and does not hold, this view of tropes – nor is any philosopher who recognizes tropes committed to this view. Indeed, as I have already indicated, I take a trope to be a particular mode or property whose existence requires the existence, not merely of some substance or other, but of the very substance it does inhere in. Its identity depends on this substance, and it cannot exist apart from the latter.

Descartes may even hold that all modes or attributes are tropes, at least all those that are real. For in the *Principles*, as we shall see, he puts forward a view according to which universals have no real existence: they are nothing but “modes of thinking,” which is to say ideas, which have no existence outside our thought. If that is true, then no real mode or attribute could be a universal. If there were any real modes at all they would have to be particulars, hence tropes. This is an interesting issue, one well worth exploring further.

Two Further Points About Substances in the *Meditations*

So far I have confined my attention to the account of substances that Descartes provides in the *Meditations* and the *Replies to Objections*. But I have not considered all the passages in these works in which Descartes talks about substance. In Meditation Three he makes two further points that are worth noting. The first is that God is a substance, and hence must be included in the category of substances, along with minds and bodies. To be sure, Descartes’s God is an infinite and eternal, and hence an uncreated, substance, whereas minds and bodies are finite, created, and exist in time, even if once created they last forever. But there is no suggestion that God and creatures are not substances in the same sense of the word, or members of the same ontological category (2:31; AT 7:45).

The second point is that some things have more perfection or reality than others. As every reader of the *Meditations* knows, this claim is crucial to the success of Descartes's alleged proof of the existence of God in the Third Meditation; yet the doctrine that reality has degrees is notoriously obscure. One of the few clear things about it, however, is conveyed by Descartes's examples in this Meditation: not only does an infinite substance have more reality than finite substances have, but all substances have more reality than any mode or attribute does (2:27; AT 7:40). The doctrine that an infinite substance has more reality than a finite substance seems to violate Aristotle's dictum that "one [primary substance] is no more a substance than another: the individual man is no more a substance than the individual ox" (Aristotle 1963: 7; §5:2b26). Of course, Descartes may not take "has more reality than" to entail "is more a substance than"; yet in his Third Replies (to Hobbes) he says that "an infinite and independent substance is more a thing [*magis res*] than a finite and dependent [one]" (2:130; AT 7:185), and he often uses the terms "thing [*res*]" and "substance" interchangeably.

Substance in the Synopsis of the *Meditations*

In the Synopsis of the *Meditations*, which Descartes wrote after he had finished the work itself, but before composing his *Replies* to the *Objections* made to it, he undertakes to explain why he has not included arguments for the immortality of the soul in his book – and then proceeds immediately to sketch such an argument. This argument starts with a definition of a substance as a thing "which must be created by God in order to exist." This definition is different from the one he gives in the body of the *Meditations*, and although he mentions one consequence of it in the Second Replies and another in a letter to Regius (3:208; AT 3:505), the definition itself is not repeated anywhere else in his works – a curious fact which he never undertakes to explain. Descartes then asserts that if something is a substance according to this definition, then it is "by [its] nature incorruptible and cannot ever cease to exist unless it is reduced to nothingness by God" (2:10; AT 7:14). His final step in the argument is to affirm that the human mind is a substance by this definition. It follows thence that the mind (or soul: Descartes often does not distinguish these) "is immortal by its very nature" (*ibid.*).

Most of the heavy lifting in this argument is done by its starting premise, namely its definition of substance, for which Descartes offers no justification whatsoever, either here or elsewhere in his writings. He does say on one occasion that the things that satisfy this definition are *pure* substances, as if he were introducing a new and more refined notion than that of substance *simpliciter*. But if that is his intention he does not announce it, and this is not a notion that he so much as mentions anywhere else. And if that is not his intention; if he means rather to be defining the same concept as the one he elsewhere takes to be the concept of substance, then the consequences are quite radical. For the extension of this new concept is quite different from that of the other.

By this definition, although human minds still qualify as substances, individual human bodies do not. The only corporeal or extended thing that counts as a substance according to this definition, Descartes says, is "body, taken in general" [*corpus . . . in genere sumptum*] – by which he seems to mean "everything corporeal lumped together, and regarded as one thing," or "the whole consisting of all the individual bodies in the

world.” Now it is true that, given Descartes’s physics, body in this sense is “by [its] nature incorruptible and cannot cease to exist unless [it is] reduced to nothingness by God”; so that “it too never perishes.” But an individual body, including an individual human body, which Descartes calls and treats as a substance everywhere else in his writings, is nothing but “a certain configuration of members and other such accidents joined together [*conflatum*]” (cf. 2:109; AT 7:153). Individual minds do not have members, or any other parts, but they do have accidents, in the form of different thoughts at different times. But “even if all the accidents of a mind change, . . . it does not for that reason become a different mind.” A human body, by contrast, “loses its identity merely as a result of a change in the shape of some of its parts.” It follows, Descartes concludes, that a body “can very easily perish, [whereas] the mind is immortal by its very nature” (2:10; AT 7:14).

If a body cannot survive a change in the shape of its parts, then it is reasonable to think that it also cannot survive a change in the number of its parts: that it loses its identity if even one part is added or subtracted. This is the doctrine that some recent philosophers have called “mereological essentialism” (see *The Cambridge Dictionary of Philosophy*, s.v. “haecceity”). But this doctrine conflicts with a position that Descartes commits himself to later on, namely, that every part of a (material) substance is itself a substance (see below). Since he seems more firmly committed to this other position – he affirms it at other places in his writings – it is likely that he did not intend to introduce a new definition of substance in the Synopsis, a definition that would replace the one he had already given (and would give again). But what he did intend remains obscure.

Substance in the Fourth Replies

In the Fourth Replies, Descartes tries to defend his Sixth Meditation argument for the real distinctness of the human mind and body. This argument requires the premise that *x* and *y* are distinct if “I can clearly and distinctly understand [*x*] apart from [*y*] [*possim unam rem absque altera clare et distincte intelligere*]” (Meditation Six: VII, 78; II, 54). In response to a counterexample proposed by Caterus, the author of the First Objections, Descartes restricted this premise to complete things, and claimed that Caterus’s example was merely an “abstraction of the intellect” (VII, 120ff.; II, 86). Arnauld’s criticism of the argument containing this restricted premise is that Descartes, if all he knows about the mind is that it is a thinking thing, does not know enough to be certain that it is a complete thing. To this Descartes’s response is, first, that “by a ‘complete thing’ I simply mean a substance endowed with the forms or qualities which enable me to recognize that it is a substance”; and second, that merely knowing that a mind has the attribute of thinking is enough to enable me to recognize that it is a substance. Descartes goes on to elaborate on this response, but we need not go through the details of that discussion. What is important for our purposes is to take note of two points about substances that he mentions in the course of it.

The first is a definition of substance, one that turns out to be different from the one he had given in the Third Meditation and elaborated in the Second Replies. “The notion of a substance,” he says here, “is just this – that it can exist through itself [*per se*], that

is, without the aid [*ope*] of any other substance" (VII, 226; II, 159). The first part of this definition is identical with what he had said before. But the explanatory clause that follows is different. Here he says that a substance must not depend for its existence on another *substance*, whereas in the earlier passages his stipulation was that a substance must not depend for its existence on its *modes or attributes* (or at least on all of its modes or attributes). The question arises: what sort of relationship is it that he stipulates may not obtain between one substance and another? It cannot be the relationship that holds between a mode and a substance because only modes (or attributes) stand in that relationship, and no substance is a mode.

One possibility is that it is a causal relationship: for example, the relationship such that substance *x* depends on substance *y* in that *y* produces or creates *x*, and *x* would not have existed had *y* not created it. This is the relationship that Descartes seems to have in mind in the *Principles* where, as we shall see, he proposes yet another definition of a substance. Another possibility is some sort of part-whole relationship. If the parts of a substance are substances, then substance *x* would depend on substance *y* if *y* is a part of *x* and if every substance has to have, in order to exist, just the parts it does have – if, that is, mereological essentialism is true of substances. To deny that one substance depends on another would, in this case, be to deny that mereological essentialism is true for substances.

There is also the possibility of a part-whole relationship running in the opposite direction, so to speak: the relationship such that if the parts of a substance *x* are substances, then they depend on *x* in that they would not exist if *x* did not exist; this is a position that might be adopted by a certain kind of metaphysical holist.

Descartes does hold that the parts of a substance (at least of a corporeal substance) are (corporeal) substances. (This is the second of the two points I mentioned a moment ago.) He says as much in the *Principles*: "each and every part of [a corporeal substance], as delimited by us in our thought, is really distinct from the other parts of the same substance" (a real distinction, he tells us earlier in the same paragraph, "exists only between two or more substances") (VIII, 28; I, 213). In the Fourth Replies, he makes his case with an example. A human hand, he says, is a part of a human body, yet that fact does not prevent it from being a substance itself. It is true, Descartes acknowledges, that a part such as a hand is sometimes called an "incomplete substance," but that cannot mean that it is "unable to exist *per se*"; for if that were true, it would not be a substance. What it means, rather, is that, "although it has nothing incomplete about it insofar as it is a substance, it is incomplete insofar as it is referred to some other substance in conjunction with which it forms [*componunt*] a unity in its own right [*unum per se*]." Descartes does not tell us here what it takes for something to qualify as a *unum per se*, but from the case of the hand we can infer that a whole human body is one example of a thing that does. He goes on to say that "in just the same way the mind and the body are incomplete substances when they are referred to a human being which together they make up [*componunt*]. But if they are considered by themselves they are complete" (VII, 222; II, 156ff.).

The two cases are not exactly parallel, however. The hand is a part of the whole human body, which is a substance, and it is, presumably, an *unum per se* as well. But it does not follow that the human being is a substance; and indeed, I maintain, it is not

one, despite being an *unum per se* (for detailed defenses of this position, see Chappell 1994; Voss 1994; Kaufman unpub. (a)).

In adopting this doctrine, that the parts of a (material) substance are themselves substances, Descartes is making a radical break from the views of his Scholastic predecessors. Descartes's position not only conflicts with the Scholastics' conception of living organisms, which are the paradigm substances in their view. It also undermines their doctrine of substantial form, which is the key to their account of the individuality of all substances. Descartes, however, never spells out the details of his view, and he leaves many questions about it unanswered. Nor does he make explicit his reasons for adopting it – other than to provide a defense against the objections raised by Arnauld to his argument for mind-body dualism, which was one of his central preoccupations in the whole *Meditations*. There is also the question of the coherence of this doctrine with the rest of Descartes's thinking about individual material substances – a question that deserves more attention than Descartes scholars have given it. (There is some discussion of this doctrine in Garber 1992 and Stuart 1999, and it is fully explored in Kaufman unpub. (b)).

Substance in the *Principles*

Descartes wrote the *Principles* soon after he published the *Meditations* and its accompanying *Objections and Replies*. In this work he presents his views in the form of a Scholastic textbook, hoping thereby to encourage Jesuit scholars to read it. Included in it is an account of substance that is fuller than the earlier one, but that also seems to conflict with some provisions of the earlier account. The account is part of a systematic ontology which specifies the natures of all the “things that fall under our perception” and the relations they bear to one another. (By “perception” here Descartes does not mean “sense perception”: the things we perceive are all the things we have some understanding or awareness of.)

Descartes presents the basic elements of his ontology in §§48–59 of Part One of the *Principles* (1:208–13; AT 8A:22–8). The articles following §59 refine and illustrate the basic scheme but do not really extend it. In order to place Descartes's account of substance in the context that he provides for it, I shall start at the beginning of the basic scheme and work through it in an orderly way (though not exactly in the order he follows).

To facilitate reference, I offer the following chart (figure 15.1), which lists the various categories of entities that the scheme encompasses and shows the relations among them. Different lines in the chart represent different “levels” in the scheme, which are numbered in the left margin; asterisks at each level represent “nodes” or points at which two non-overlapping subcategories of a category are distinguished from one another; the subcategories are connected by lines to the left and right of the node, and the line above the node points to the category that is subdivided at that point.

Within the whole category of things we perceive, Descartes first distinguishes between “eternal truths” and “things or affections of things”: this is the first-level node of the structure. Eternal truths, Descartes says, “have no existence outside our thought,”

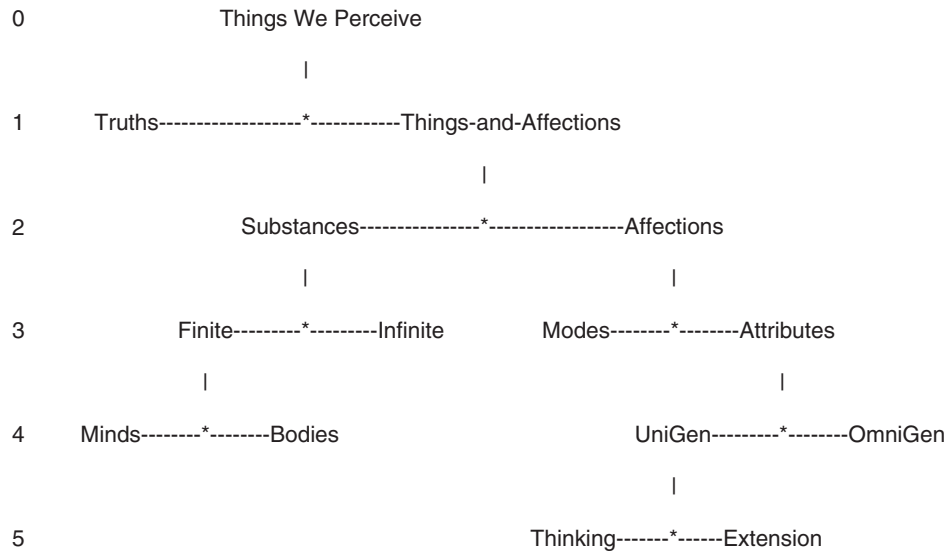


Figure 15.1 Descartes's ontological scheme

implying that they do exist within it. He must regard them, therefore, as mere objects of thought, *entia rationis*, to use the Scholastic term, or “objective beings,” to use his own term from the *Meditations*. Note further that they have no existence outside *our*, that is, human thought. Descartes does not say that we human beings *create* these truths: they need not be the products of our minds. But it is in our minds and only there that they “reside.” (Portions of the preceding paragraph, and of the next several paragraphs, are based on Chappell 1997: 113–17.)

The other category that Descartes introduces at the first level is “things or affections of things [*res rerumve affectiones*].” This is not one single category but a compound of two, things on the one hand, affections of things on the other. Descartes eventually distinguishes these two, identifying the one with “substances,” the other with “attributes.” In the meantime he treats them together. (Sometimes he even refers to the compound category simply as “things [*res*],” although I shall sometimes use the hyphenated title “things-and-affections-of-things” to speak of it.) His reason for doing so, I think, is that he wishes to introduce two further distinctions which cut across the distinction between substances and attributes. One of these distinctions is that between “the most general things” and things that are restricted to a single genus; the other divides intellectual or thinking things from material things. In each of its occurrences in the previous sentence, the word “things” is short for “things-and-affections-of-things.” But I doubt that Descartes really does think that there are substances among the most general things. His view is, I believe, that all such things are attributes, or at least things attributed to substances. (Here I disagree with the position I took in Chappell 1997.) On the other hand, he certainly does hold that the intellectual-material distinction applies to both substances and attributes. (I shall consider these two further distinctions in a moment.)

Descartes takes eternal truths to be objects of thought, that is, objective beings. It might be supposed that he regards things-and-affections-of-things as entities existing outside human thought, that is, as actual beings (to use a Cartesian term found in the *Meditations*). The fact is that he does consider many things (i.e., substances) and many affections of things (i.e., attributes) to be actual beings, but not all of them. In §57 of the passage, he introduces a distinction between attributes which are “in the very things of which they are said to be attributes” and those which are “only in our thought.” The same distinction may be made, I believe, among substances, though Descartes takes no notice of it here. But this is just the distinction between actual beings and objective beings, between those that exist outside and those that exist within our thought.

In §§51ff. Descartes focuses on substances by themselves, distinguishing them from attributes. He first gives a definition of a substance, which is both like and unlike the definitions he has given in earlier works. By a substance, he says, “we can understand nothing other than a thing which exists in such a way as to depend on no other thing [*res*] for its existence” (1:210; AT 8A:24). This definition is like the others in that it declares a substance to be independent of other things. It is unlike the definition in the *Meditations* and Second Replies in that the other things specified there are modes and attributes. In the Fourth Replies, the other things are said to be substances, but the kind of independence is left open; as we saw, the independence intended there could have been causal or it could have been mereological, that is, a relation between parts and wholes. Here in the *Principles*, however, the independence Descartes has in mind is a relation between a substance and other substances, and the relation is causal in nature.

This is made plain by what Descartes says immediately following his definition of a substance. By this definition, he points out, there is only one substance, and that is God, the only being that “depend[s] on no other thing whatsoever.” Individual minds and bodies, which have heretofore been called substances, depend upon God for their being. Having created them *ex nihilo*, God caused them to exist in the first place; and he keeps them existing at each moment afterwards by his “concurrence,” which amounts to continually recreating them. But individual minds and bodies, Descartes says, depend on no substance other than God, either for their initial or for their continued existence. So created minds and bodies are like God except in this one respect; and because of this likeness, it is legitimate to call them “substances,” though the term will have to be taken in a loose, or qualified, or relative sense. As Descartes puts it, “the term ‘substance’ does not apply *univocally* . . . to God and his creatures.” This is not a position he takes or even hints at in earlier works.

There is an interesting passage in the French translation of the *Principles*, published three years after the Latin edition; Descartes generally praised the translation, which was made by his friend Picot, but did not necessarily approve every detail of it. The passage was added at the end of the Latin text in §51 and reads as follows: “Among created things, some are of such a nature that they cannot exist without others. Among these, in turn, we distinguish between those that need only the ordinary concurrence of God [in order to exist] – these we call substances – and the rest, which we call the qualities and attributes of these substances” (1:210; AT 9B:47). If the view expressed in this passage is indeed that of Descartes, then his definition of substance in the

Principles is not distinct from, but includes, the one given in the *Meditations*, for it makes the existence of substances independent of their attributes as well as of other substances (except God).

The Most General Things

In any case, Descartes does distinguish substances from attributes in the *Principles*, and having defined substances in §51, he goes on to consider attributes. Before discussing attributes, however, I want to review his account of the “most general things [*res maxime generalia*],” which he first mentions in §48 and further discusses in §§55 and 57ff. (first mentions in the *Principles*, that is, for he lists instances of them, under no general designation, in the Third Meditation and the Second Replies). This category is presented as subordinate to the compound category of things-and-affections-of-things, but, as I noted earlier, no substances appear to be included in it; hence all such things must belong to the affections part of the compound.

Descartes does not specify the nature of these “most general things” in §48, although he gives examples of them. The examples he gives are “substance,” “duration,” “order,” and “number”; later he adds “existence” (§56) and perhaps “time” (§57) to the list. All of these items appear to be attributes for Descartes, except for substance. That he takes existence to be an attribute is clear from his presentation of the Ontological Argument in the Fifth Meditation. Many subsequent philosophers, from Kant to G. E. Moore, have rejected this conception of existence, and in the Fifth Objections Gassendi criticized Descartes for holding it (2:224–7; AT 8:322–36). But Descartes rejected Gassendi’s position, and stuck to his guns (2:262–3; AT 7:382–4).

The occurrence of “substance” on this list of most general things, however, is puzzling, given that, as I’ve claimed, no substances are included among the most general things. What Descartes has in mind here, presumably, is the fact that substance can be truly attributed to (individual) substances, and to every one of them, whether mind or body (or even God, despite Descartes’s doctrine in the *Principles* that God and finite things are substances in different senses of the word). But the second “substance” in the statement “This substance is a substance” is not used to designate an individual substance, nor does it stand for a mode or attribute – the sort of thing that both Descartes and Aristotle would say exists *in* a subject. It is rather a class term or category term: to say that *x* is a substance in this sense is to place *x* in the class or category whose members are all and only the (individual) substances there are (or could be). The category of substance is thus akin to an Aristotelian species or genus. It is a “secondary substance,” which is a universal – the sort of thing that Aristotle would say is *said of* a subject. Descartes takes no explicit notice of such things in his ontology, as we’ve noted. But it appears that he is committed to their existence nonetheless.

Uni-Generic Attributes

Descartes says that these most general things “extend to all genera of things,” that is, that they can be attributed to all kinds of substances. It is appropriate, therefore, to refer

to them as “omni-generic” attributes. The contrast, evidently, is with attributes that apply to substances within a single genus: “uni-generic” attributes. What genera of substances are there for Descartes? In §48 he announces that he recognizes “no more than two ultimate [*summa*] genera of things, the intellectual or cogitative, and the material.” Since at this point in his exposition Descartes has not separated attributes from substances, the implication is that there are both attributes and substances within these two genera. The attributes belonging to them he calls “thought” or “thinking” and “extension,” respectively; the substances are “minds” and “bodies.” Although this is not explicit at the time, it soon emerges that these two genera divide the category of substances both exhaustively and exclusively: not only are there no omni-generic substances, there are no non-generic ones either. As for attributes, the division is neither exhaustive nor exclusive. For omni-generic attributes are neither intellectual nor material in nature and they belong both to minds and to bodies. To be sure, in Descartes’s view there are no attributes of any kind that belong to nothing, and there is no mind or body to which some of them at least do not apply. (It might be claimed that Descartes’s God, although he does have existence and number, lacks duration: being eternal, he is not in time at all.)

It is worthy of note that Descartes does not cite any basis or principle for the doctrine that there are no more than two *summa genera* of things. Of course, he does have an argument, or perhaps several arguments, for his claim that minds and bodies are really distinct from one another – which amounts to claiming that no substance can belong to both of these genera.

A question might be raised about my contention that Descartes’s distinction between intellectual and material things, or minds and bodies, is exhaustive, as well as exclusive. For in §48, after giving examples of attributes that fall under the genera of intellectual and material things, Descartes introduces what looks like a third genus of attributes. These comprise, he says, “certain other [things] [*alia quaedam*]” that “we experience within ourselves,” and which “must not be referred [*referri*] either to the mind alone or to the body alone, [but] spring from [*proficiscuntur*] the close and intimate union of our mind with our body.” Among such “others” he lists, “first, appetites such as hunger and thirst; second, the emotions or passions of the mind which do not consist solely of thought, such as the emotions of anger, joy, sadness, and love; and finally, all the sensations, such as those of pain, pleasure, light, colors, sounds, smells, tastes, heat, hardness, and the other tactile qualities.”

But exactly what position is Descartes maintaining in the passage? His words do not make this entirely clear. One possibility is that he takes appetites, emotions, and sensations to constitute a separate ontological category, a distinct kind of attribute, apart from and on a par with the intellectual and material attributes which (one presumes) are to be referred solely to the mind and solely to the body, respectively. On this understanding, Descartes would be not a dualist but a “trialist,” as John Cottingham has put it, at least regarding attributes.

(Cottingham attributes such “trialism” to Descartes in Cottingham 1985, although he does so on the basis of texts other than this one in the *Principles*. Other scholars have taken the stronger position that Descartes is a trialist regarding, not (or not merely) attributes, but substances as well, i.e., that he recognized three distinct genera of substances, including human beings – or “mind-body unions” – in addition to minds

and bodies separately; see Broughton and Mattern 1978; Hoffman 1986; Schmaltz 1992; Markie 1994. I have already announced my opposition to this stronger form of trialism at several points above. My reasons for rejecting it are given in detail in Chappell 1994. Cf. Voss 1994. See also Kaufman unpub. (a) for an argument against (substance-)trialism that is more cautious and perhaps more judicious than mine and Voss's are.)

Alternatively, it could be Descartes's view that these entities belong to one or the other of the two categories, and differ from its other members only at some sub-categorical level.

My view is that Descartes accepts the latter of these two alternatives. I take appetites, emotions, and sensations to belong ontologically to the category of intellectual attributes, and not to constitute a distinctive third kind of attribute. My basis for this understanding is what Descartes says about sensing et al. in the Second Meditation, that this and similar conscious activities, "precisely taken," are nothing but forms of thinking, no less than understanding and doubting are (2:19; AT 7:29). These attributes differ from the others in this category in that they require material as well as intellectual causes in order to exist, whereas the other intellectual attributes require none but intellectual causes. (Correspondingly, attributes in the material category require none but material causes.) But it is not the kind of cause a being has that determines its ontological category, at least at the level at which intellectual and material things are distinguished. For causes, according to Descartes, operate across these categorical boundaries (see, for example, 2:275; AT 9A:213).

Attributes in General

We come now to Descartes's category of attributes, which is the other component of his compound category of things-and-the-affections-of-things. He does not have much to say about attributes in general; it is the divisions within this category that engage his attention. His basic understanding of attributes is derived from the maxim, already invoked in §11 of Part One of the *Principles*, that "nothingness has no attributes," whence it follows that an attribute cannot exist without some substance for it to belong to (1:196; AT 8A:8). This same maxim serves, as we saw, to define what a substance is for Descartes, at least in the *Meditations* and the Second Replies: a substance is a being that exists *per se*, that is, independently of some or any attributes. An attribute, by contrast, is a being that exists *per aliud*, where the *aliud* is a substance.

In §53 of Part One of the *Principles*, Descartes introduces one of the subcategories of attributes that interests him and in doing so lays down one of the most fundamental principles of his ontology. A substance, he declares, has many attributes, "but for each substance there is one principal property [*sc.* or attribute], which constitutes its nature and essence, and to which all [its other attributes] are referred [*referuntur*]." By "one" principal property here Descartes means "one exactly," not "one at least"; and for a property to "be referred to" another, he tells us two sentences later, is for it to "presuppose [*praesupponere*]" it. But when he says that "all" the other properties of a substance are referred to its principal one, he does not mean "all" literally and without qualification. He means all of its uni-generic properties, for the point does not hold, for example,

for existence or number. From the mere fact that something exists, or is one, nothing whatsoever follows as to what its principal property is.

The principal property of minds, of course, is thinking; that of bodies is extension; and Descartes frequently, throughout his writings, identifies thought and extension as the essences of these substances, respectively. He has some trouble defining “essence,” however. One problem is to distinguish essences from omni-generic attributes, since he says the same thing of these that he does of the latter, that they are “always present” in the things that have them: a substance (that once has them) never lacks them. And not only does it never lack them in fact, but it could not lack them and still exist. Indeed, Descartes goes so far as to say (in §62) that a substance and its duration are distinguished merely *ratione*, which means that the substance “cannot be understood without” that attribute. This is exactly what he holds about the distinction between a substance and its essence: a body or a mind cannot be understood as lacking extension or thought, respectively.

So, then, what is the difference between an essence or nature and an omni-generic attribute for Descartes? For one thing, an essence or principal attribute determines a genus of things, indeed a highest genus (there being only two such attributes), in the sense that the class containing all and only the substances that have it constitutes a genus, whereas an omni-generic attribute does not. Again, the essence of a substance is entailed by each of its uni-generic attributes – or, to put it in a more Cartesian way, the concept of the one is contained in that of the other – whereas its omni-generic attributes are not entailed by each of its uni-generic attributes. These are not of course surprising points, since they are built in to Descartes’s definitions of the term “genus” and to my definition of “uni-generic.”

It appears from these considerations that, as I remarked earlier, Cartesian principal attributes have some affinities with Aristotelian secondary substances, in both nature and function. It would be interesting to explore the parallels further, in an effort to explain why Descartes thinks that each substance has a principal attribute in the first place, and why he thinks that there are only two of these. But this is not a task that he himself takes on.

At this point, Descartes turns his attention to some further subdivisions within the category of attributes. In §56 he distinguishes attributes in the strict sense from modes and qualities, and then modes (in the strict sense) from qualities. Later, in §59, he marks off the Aristotelian *differentiae*, properties, and accidents, within the broader category, and distinguishes these from one another. He seems not to attach much weight to these distinctions, however. He neither speaks further of them nor is guided by them in the rest of his elaboration of his ontological scheme.

More important for him is a distinction he introduces in §57, between “attributes or modes [that] are in the very things [*in rebus ipsis*] of which they are said to be attributes or modes, [and] others [that] are only in our thought [*in nostra tantum cogitatione*].” This is the distinction that I earlier referred to as that between actual and merely objective attributes, and it cuts across the other divisions that occur within the whole category of attributes. (The actual-objective distinction also applies to substances, and cuts across the main divisions subsisting among them as well. For more on the distinction between actual and objective attributes and substances, see Chappell 1997: 120ff.) Both actual and objective attributes are found in both the subcategories of intellectual

and material attributes, and both are found on both sides of the division between omni-generic attributes and attributes that fall within a single genus of things. Descartes makes this explicit when he distinguishes “number, . . . considered in the abstract or in general [from number] in . . . created things” and calls the former “merely a mode of thinking [*tantum modos cogitandi*]” (1:212; AT 8A:27). (I take it that “being simply a mode of thinking,” as Descartes intends it here, is equivalent to “existing only in our thought”; in any case, he does not mean by “mode of thinking” here what he meant in the *Meditations* and elsewhere when he said that doubting, understanding, affirming, and such are “modes of thinking” (2:19; AT 7:28ff.; cf. 2:125; AT 7:177). In those passages, a mode of thinking is a species or type of thinking, not an object of thought.) And what holds for number here must hold for existence, order, and duration – though not substance – as well.

In the same passage, Descartes calls number “considered simply in the abstract and in general” a “universal,” whence he is led, in §§58ff., into a discussion of universals generally. Among such things he considers not only the omni-generic attributes he has named, but the “five common universals” of the Aristotelian Scholastics: “genus, species, differentia, property, accident,” within which group he would presumably include Aristotle’s “things said of a subject” and his own omni-generic substance and other such classes and categories.

What Descartes says about universals here makes it clear that he is no realist regarding them, of either the Platonic or the Aristotelian variety. He is, rather, a conceptualist, in very much the way that Locke is (see *The Cambridge Dictionary of Philosophy*, s.v. “conceptualism”). Conceptualists are sometimes said to have a problem accounting for mathematical knowledge, but Descartes has an ingenious solution to that problem (for details, see Chappell 1997: 123–7).

After giving his account of universals in §§57–9, Descartes elaborates on the ontological scheme he has laid out in the preceding articles by describing the kinds of distinctions there are to be made among the various kinds of entities he has been cataloguing. Substances are prominent among the entities that are the subjects of these distinctions, but Descartes says nothing new about them in this discussion, nor does he add anything to the conception of substances he has already developed.

Substance in Descartes’s Later Works

Descartes published the *Principles* fairly late in his life, but he produced several works – and many letters – after it appeared. He discusses substance in a few of these writings: in his “Comments on a Certain Broadsheet,” published in 1648, and in two sets of letters, to Arnauld in 1648 and to Henry More in 1649. But nothing he says in these discussions sheds much further light on his treatment of substance in the *Meditations*, the *Replies*, and the *Principles*.

This last judgment, that Descartes says nothing new about substance in his works after the *Principles*, has been disputed by Paul Hoffman. Hoffman claims that there is a passage in the “Comments” (namely, at 1:298; AT 8B:349–50) in which Descartes takes a position that conflicts with the important principle affirmed in *Principles*, Part

One, §53, that no simple substance has more than one principal attribute. He also claims that this passage “supersedes” the passage in the *Principles*. If these claims were true, then Descartes’s thinking about substance certainly would have undergone a significant change after the publication of the *Principles*.

But the first of these claims is not true. Hoffman has misread the passage in the “Comments”: it does not say what he says it does. As for the second claim, Hoffman offers no reason for thinking that the “Comments” passage “supersedes” the one in the *Principles*. It is true that the one work was written after the other, but that by itself is hardly conclusive. The earlier passage might still be the one that expresses Descartes’s considered and settled view, whereas the later passage might distort or misstate his true position. (I have laid out my case against Hoffman’s claims in Chappell 2006, which is available on my website at www.courses.umass.edu/chappell/publications.html.)

Hence I stand by my judgment that Descartes says nothing new about substance in his later writings. His final position is that presented in *Principles* I.

Conclusion

In this chapter I have distinguished three stages in the development of Descartes’s thinking about substance. The earliest is expressed in the *Meditations* and Second Replies; in this stage, Descartes’s views of substance are not much different from those of his Scholastic predecessors, and thus not much different from those of Aristotle, whose work so influenced Scholastic thought. In the second stage, displayed in the Reply to Arnauld, Descartes departs from his Scholastic heritage in adopting the doctrine that all the parts of a material substance are themselves substances. Finally, in the *Principles*, his third set of thoughts emerges in the context of a comprehensive ontological scheme. Here, the most important innovation is his notion of a principal attribute for each substance, coupled with the doctrines that there are only two such attributes, thinking and extension, and that every individual substance has exactly one of these.

Even with these innovations, however, Descartes’s conclusions about substance do not represent a full break with the philosophical tradition. Indeed, the tensions and problems inherent in his evolving views were clear to his immediate seventeenth-century successors, including Spinoza, Malebranche, and Leibniz. It is in their work that we see a metaphysics of substance that fully frees itself from philosophy’s Scholastic, Aristotelian heritage.

Acknowledgments

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Chapter 16

Descartes and the Metaphysics of Extension

C. G. NORMORE

The concepts of body, extension, and space are central to Descartes's thought and so closely connected with one another that it is no exaggeration to suggest that to understand one is to understand them all. There are other concepts, notably those of motion (and rest) and of duration (and time), which are only slightly less connected and which a full account of the metaphysics underlying Descartes's physics (or the physics underlying his metaphysics) would involve, but whereas the notion of extension in a more or less technical sense is at the core of the concepts of body and space, motion and duration can be understood as extended only in a broad sense of the term, and I will not treat them here.

Descartes's official ontology includes only substances and their modes. When we focus on the concepts of body, extension, and space a number of questions about how these concepts relate to those of substance and mode immediately arise. Are bodies substances or modes? Descartes holds that bodies have parts. Are parts of bodies substances, modes, or some third item not in the official ontology? How many bodies are there and how many of them are substances? How are any of these individuated? Descartes also maintains that different bodies can occupy the same place or space at different times. What then is space or place and how is it related to body and to extension?

The aim of this chapter is to explore a number of traditional but deservedly controversial theses about these questions. One is that, in one use at least, "extension" functions for Descartes as a count noun. There are precisely as many extensions as there are extended substances and each extended substance just is an extension. A second thesis is that each part of an extended substance (or extension) is itself an extended substance (or extension), so that there are indefinitely many extended substances. A third thesis is that the bodies which figure in Descartes's laws of motion are not (exactly) extended substances, nor are human bodies nor the typical material objects of daily life – cats, cameras, and the like. A fourth thesis is that a space in the sense of an "external place" just is, at any given time, the extended substance which "occupies" it – though the same space can be different extended substances at different times.

Extension and Extended Substance?

At least by the time of *Principles* I, 53 Descartes claims that the relationship between extension (*extensio*) and extended substance (*res extensa*) is that between a substance and its principal attribute (1:210; AT 8A:25). According to *Principles* I, 63, thought and extension can be regarded as constituting the natures of thinking substance and corporeal substance and so “they must then be considered as nothing else but thinking substance and extended substance itself – that is, as mind and body” (1:215; AT 8A:30–1). If we carry this consideration through consistently we are led to the conclusion that a subject, *res extensa*, and that which is said of that subject, extension, are the very same thing. How can this be and what are its consequences?

Let me stress the form of the claim. It is that for Descartes (a) body is (an) extension. On this picture (a) body is not (an) extension of something else – of some “thing” (*res*) which is other than the extension, rather it is the extension itself. If one wants, as Descartes does, to talk about a thing here then that thing is the extension itself. Such a picture has a natural correlate for mind. On it (a) mind is not something which has thinking, but rather is itself (a) thinking (though not, as we shall see, a thought). If this is right then Descartes has abolished or at least considerably reshaped the traditional distinctions between substances and qualities or more generally between things (in some very wide sense) and their properties (in a similarly wide sense).

We have already seen Descartes claim, in *Principles* I, 63, that because extension is the nature of extended substance we must consider it to be “nothing else but” extended substance, i.e., body. He there explains that we find it difficult to abstract a notion of substance in general because the distinction between the notions of thought and extension and that of substance is only a distinction of reason. One might find this puzzling. It is plausible that there be only a distinction of reason between (say) thought and thinking substance, but how could there be only a distinction of reason between thought and substance itself if substance is only distinct in reason from extended substance?

I understand Descartes here to be making the delicate point that while insofar as we have a conception of substance it is an abstraction from our conception of extended substance and thinking substance, it is in fact difficult to form such an abstract conception precisely because extension is what extended substance is and thought is what thinking substance is and there is no common feature which thought and extension have over and above the purely formal feature of being able to be determined into modes. This way of thinking is much in view in the subsequent article, *Principles* I, 64, where Descartes explains how one can take thought and extension to be modes of substance. That is why Descartes goes on immediately in *Principles* I, 64 to point out that one can take thought and extension also as modes of substance. When we do this we understand not thought or extension as such, but thought or extension as determined in this way or that. Between the substance and the determination so understood there is, as Descartes points out, a modal distinction, because while (say) a thinking substance cannot be understood as not thinking, it can be understood as not thinking this thought or that.

The view that we should not distinguish a substance from its nature, e.g., an extended substance from its extension, is not one Descartes came to suddenly in the *Principles*.

As early as *Regulae* Rule 14 we find a striking text where Descartes speaks of (an) extension as a bearer of properties. He writes:

By 'extension' we mean whatever has length, breadth and depth, leaving aside the question whether it is a real body or merely a space. This notion does not, I think, need any further elucidation for there is nothing more easily perceived by our imagination. Of course the learned often employ distinctions so subtle that they disperse the natural light, and they detect obscurities even in matters which are perfectly clear to peasants. So we must point out to such people that by the term 'extension' we do not mean here something distinct and separate from the subject itself, and that we generally do not recognize philosophical entities of the sort that are not genuinely imaginable. For although someone may convince himself that it is not self-contradictory for extension *per se* to exist all on its own even if everything extended in the universe were annihilated, he would not be employing a corporeal idea in conceiving this, but merely an incorrect judgment of the intellect alone. (1:58–9; AT 10:442–3)

Here I take Descartes to be claiming that those who think that they can conceive of an entirely empty space are mistaken precisely because to conceive an extension is to conceive an extended thing and so there cannot be a genuine idea of an extended void. Thus someone who thinks an extended void is not self-contradictory is not grasping an idea but making a mistaken judgment.

In *Le Monde* (written at least several years later) we find Descartes making a similar point, claiming not only that wherever extension is found there is something extended, but that distinguishing extension and what is extended (here, "matter") is a philosophical mistake Scholastics make. Speaking of the Scholastic conception of matter, he writes:

Nevertheless, the philosophers are so subtle that they can find difficulties in things which seem extremely clear to other men, and the memory of their 'prime matter' which they know to be rather hard to conceive, may divert them from knowledge of the matter of which I am speaking. Thus I must tell them at this point that unless I am mistaken, the whole difficulty they have with respect to their matter comes only from the fact that they want to distinguish it from its quantity and its external extension, that is from the property it has for occupying space. . . . But they shouldn't find it strange if I suppose that the quantity that pertains to the matter I describe does not differ from its substance any more than number does from things numbered and that I conceive of its extension or the property it has to occupy space not as an accident but as its true form and essence. (AT 11:35–6)

That the relation of extension to the extended thing is just that of number to the things numbered is the guiding analogy of Descartes's thinking on this matter. He develops it further in *Principles* II, 8, where he goes into some detail about the relations between quantity and extended substance. He first insists that the distinction is "only a conceptual one, like that between number and the thing numbered." He then points out that we can consider the nature of an extended substance apart from its quantity because "we understand this nature to be exactly the same in any part of space as in the whole space," meaning, I take it, that in conceiving what it is to be an extended substance we need not conceive of any particular one. As he immediately points out

the situation is similar with numbers. To understand 10 we need not understand any particular collection of 10 and to understand 10 feet we need to understand it as some 10 feet but we need not conceive of any particular 10 feet. In *Principles* II, 9 he sums up his position this way:

Others may disagree, but I do not think they have an alternative perception of the matter. When they make a distinction between substance and extension or quantity, either they do not understand anything by the term 'substance' or else they have a confused idea of incorporeal substance which they falsely attach to corporeal substance, and they relegate the true idea of corporeal substance to the category of extension, which, however, they term an accident. There is thus no correspondence between their verbal expression and what they grasp in their minds. (1:216–17; AT 8A:45)

Indeed, as the passage from the *Regulae* quoted above already indicates, at the root of Descartes's rejection of the intelligibility of a vacuum is his thought that to conceive of an extension just is to conceive of something extended. For example, at *Principles* II, 16 he writes:

It is manifest that one cannot grant a vacuum taken in the philosophical sense, that is [one] in which there is no substance at all, from the fact that the extension of space or of internal place does not differ from the extension of body. For from this alone, that a body is extended in length, breadth and depth, we may rightly conclude that it is a substance, because it is in every way inconsistent that there be an extension to nothing and also, we should conclude of the space which the vacuum is supposed to be, that since there is an extension in it, necessarily also there is substance in it. (1:229–30; AT 8A:49; translation altered)

Descartes never retreats from this view. In a letter to the Marquess of Newcastle of October 1645, Descartes claims that our idea of matter is just that of space:

I also said expressly in article 18 of Part II that I think the existence of a vacuum involves a contradiction because we have the same idea of matter as we have of space. Because this idea represents a real thing to us, we would contradict ourselves, and assert the contradictory of what we think, if we said that that space was void, that is that something we conceive of as a real thing is not real. (3:275; AT 4:329)

Even as late as the summer of 1648 he maintained in his conversation with Roberval (if the latter is to be believed) that body and space are entirely the same (AT 11:689).

Of course, the focus of Descartes's discussion is not on showing us that extended substance is just extension, but rather on showing us that extension is always extended substance – that is on showing us that there is never extension without something extended. Note though that the problem he seems to see with supposing that there was extension without something extended is not that there is some conceptual absurdity in thinking of extension itself as a subject of properties, but rather that there is a conceptual absurdity in granting that one has such a subject while insisting that one needs more in order to have substance. This is the theme Descartes sounds from beginning to end – that extension just is matter, that is extended substance. Extension brings with it the notion that it is a subject. Nothing further is needed.

Commentators have been reluctant to accept a straightforward identification of extension with matter in Descartes. I suspect the major reason for this reluctance is philosophical. Extension appears to be a feature or property of something. Substance, on the other hand, appears to be a bearer of features or properties. To identify the two seems to be to make a category mistake. The worry is already in the sixth-century writer John Philoponus who, partly for these reasons it seems, regards extension as distinct from body:

For what is extended in three dimensions is not automatically a body, since it is by virtue of being something else that body is extended in three dimensions. Body is a substance; quantity is a property of substance, so three-dimensionality is a property of substance. But body is a substance, and hence three-dimensionality is a property of body. For it is body in that it is composed of matter and such-and-such a form, but because quantity is an inseparable property of body, therefore it is extended in three dimensions. (Furley 20; Philoponus, 561)

Descartes does not think that body is composed of matter and form, since in general he denies there are substantial forms of material beings, but one might naturally suppose that he does think of *res extensa* to be a stuff (matter) which has the essential and inseparable property of being extended in three dimensions. This is exactly what I take him to be denying. Matter is not a stuff which has extension; rather, it is extension and is thereby, if you like, a stuff. Can philosophical sense be made of this?

Let me first try to make some historical sense of it. There are two thoughts which we need to be able to think to make any kind of sense of the position I've attributed to Descartes. One is that a quantity as such might be able to be a bearer of properties, so that Philoponus is wrong to think that three-dimensionality has to be a property of something which has a quantity rather than of the quantity itself. A second is that quantity is not merely a feature of a substance, not even an essential or inseparable one, but rather is substance itself.

These thoughts have a history in the medieval tradition that may be of some use in shedding light on how it might come to pass that Descartes is able to blur the traditional distinction between quantity and substance without raising more than an occasional eyebrow.

Quantity is one of Aristotle's nine accidental categories and on one traditional interpretation of those categories an item in one of them is dependent on a substance both for its individuation and for its existence. There are, however, hints in Aristotle that matter is in some way a principle of individuation. That matter can account for individuation is a puzzling thought, since of itself matter seems even a less likely candidate to be an individual than does form. How, then, could matter, so sorely in need of individuation itself, account for the individuation of substances? Avicenna cut this Gordian knot by distinguishing between matter as such and quantified matter and suggesting that quantified matter was individuated by its quantity. Exactly what Avicenna had in mind by this is not entirely clear, but Aquinas took up the suggestion and used it to solve a very difficult theological problem – that of the phenomenology of the Eucharist.

As Aquinas understands it, what happens in the Eucharist is that the bread of the host and the wine in the cup are converted into the Body and Blood of Christ and yet

the qualitative accidents of the bread and wine remain but do not remain as accidents of the Body of Christ. How then do they remain? These accidents are accidental forms and so they are individuated by a relation they bear to something else. What exactly is that something else?

Accidental forms are forms, and forms for Aquinas are neither universal nor individual in themselves. As found in the mind they are universal. As found in individual substances they are individual. But since they are not individual of themselves, Aquinas thinks they have to be made individual. Accidental forms are individuated by the subject in which they inhere, but what exactly is that? Aquinas suggests that the substantial forms of material substances are individuated by the matter which they inform. But on Aquinas's view the only matter in a substance is prime matter. Prime matter is not of itself individual any more than substantial forms are. How then could two principles which are not individual combine to make something which was? In his theological works Aquinas seems to handle this problem by suggesting that matter is individuated prior, logically, to its being informed by a substantial form. Matter is individuated by being under dimensions, that is by being quantified. (This makes quantity, which is after all an accident for Aristotle, a very strange accident indeed.)

Aquinas's thought seems to be that in the ordinary case both material substances and material accidents are individuated by being in individual parcels of matter which are themselves primary subjects of quantities with dimensions (what the Dominican Fathers in their translation of the *Summa Theologiae* call "dimensive quantities") through which the accidents are immediately individuated. In the special case of the Eucharist the matter is transformed into the matter of the body of Christ, but the dimensive quantity remains as a subsistent item which still serves as the basis for (and now can be regarded as the subject of) other accidents. Thus Aquinas adjusts the Aristotelian picture that what an accident is is a way that a substance is only in the minimum way required to account for the Eucharist. He maintains that every accident other than quantity requires a subject distinct from it, but allows that by a miracle quantity can exist without inhering in a subject and can serve as the subject of other accidents.

If this is right then we see in Aquinas's account of the Eucharist that quantity can serve as the subject of qualitative accidents. Moreover we see that while for Aquinas quantity cannot naturally exist apart from substance, it supernaturally can – there is nothing in what quantity is which requires substance as a subject – though it is part of what quantity is that it requires something more than the usual concurrence of God to sustain it in existence. Thus, in the Eucharist, God has to perform a miracle by playing, in addition to the roles God usually plays, the sustaining role ordinarily played with respect to quantity by a created substance.

Aquinas proposes in his theological works both that quantity is individuated primitively and not by the substance in which it inheres and that it can be conserved miraculously by the power of God without inhering in any substance, but there is no hint of either part of this doctrine in his commentaries on Aristotle, where he maintains the "orthodox" position that the substance in which it inheres is involved in the what-it-is of any accident including quantity – a position which seems to entail that a contradiction would be involved in the accident existing apart from every substance. The next step, to the view that quantities and qualities have a being of their own such that no miracle is required for them to exist apart from substance, can be found, as Giorgio

Pini has recently pointed out, in Scotus's final views on the Eucharist. Whereas Aquinas began as a philosopher with the Aristotelian intuition that accidents are only, in the sense that for an accident to be is for a substance to be thus-and-so and as a theologian made an exception only reluctantly, only for quantity and only in the context of the Eucharist, Scotus, towards the end of his life, seems to have concluded for both philosophical and theological reasons that qualities, quantities, and relations are genuine beings and that no genuine created being, substantial or accidental, is essentially dependent (that is, dependent for being what it is) on any other created being. There is, on Scotus's mature view, nothing about what a quantity or a quality is which makes it necessary that it inhere in something else. Thus the existence of quantities apart from substances does not require a miracle. What requires, if not a miracle at least an explanation, is why it is that the world is so organized that accidents normally and naturally inhere in substances. We can no longer derive that aspect of the order of nature directly from the natures of the items, the substances and accidents involved. Moreover, accidents have now taken on a new ontological robustness; we have arrived at what Descartes describes as the doctrine of real accidents.

Descartes criticizes the doctrine of real accidents on the ground that it makes accidents into substances. The criticism is revealing in the present context because it shows that Descartes thought that what could exist apart from every other created substance would *ipso facto* be a substance. Thus, if quantities can exist without existing in something else as a subject, then by Descartes's lights they are substances.

Scotus declares the ontological independence of quantity from substance but, unlike Aquinas, he does not privilege quantity as a bearer of other accidents and, while he provides a foundation for the view that quantity is a substance, Scotus does not draw that consequence.

Ockham does. Ockham is cautious about endorsing any particular theory of the ontological status of quantity, but there is a view which he consistently ascribes to Aristotle and which seems to be his own considered view. It is that "no quantity is really distinct from substance and quality" and that "continuous permanent quantity is nothing other than a thing having one part distinct in situation [*situs*] from another part so that these two, 'continuous permanent quantity' and 'thing having part distinct from part,' are so equivalent in signifying that they will be convertible terms" unless, as he adds, there is some difference in their logical or grammatical constitution – a difference which would not affect what they picked out – which prevents their being synonyms. He adds: "And therefore when a substance has a part distinct in situation from a part, and similarly when a quality does, some quantity will not be another thing than the substance and some quantity will not be another thing than the quality." Turning to discrete quantity he sums up the view this way:

Concerning discrete quantity they say that number is nothing other than the things numbered. Hence they say that just as the unity of a thing is not some accident added to the thing which is one, so number is not some accident added to those things which are numbered. (S.L 1 cap 44; my translation)

There are many such passages in Ockham's work and they have usually been read by scholars as part of Ockham's program of eliminating quantities in favor of substances

and qualities. They can, however, be seen in a different light as claiming that wherever there is quantity there is *ipso facto* either a quality or a substance. But since Descartes thinks that a real quality would be a substance, these alternatives amount to the same thing; thus we have here fertile ground for the idea that extension (continuous permanent quantity) just is extended substance.

As indicated above, there are textual grounds for attributing this position to Descartes. There are, however, texts which seem to point in a different direction and which have led some authors to conclude that the attribution of the view to Descartes can be ruled out on purely textual grounds. According to most of the authors who are of this mind, the most telling passages are in Hobbes's *Objections to Descartes's Meditations* and Descartes's reply to them. On one reading of these passages Hobbes here accuses Descartes of holding in the case of thinking (*cogitans*) and thinking substance (*res cogitans*) the very position I am attributing to him with respect to extension and extended substance and Descartes indignantly denies it on grounds which seem generalizable to the case of extension as well. Hobbes suggests that Descartes, in arguing from the indubitability of his thinking to the conclusion that he is a thinking (thing), a *res cogitans*, has conflated a substance with a mode. Descartes goes out of his way to reject the conflation. As I see it, Hobbes's objection is not that Descartes has illegitimately inferred from the fact that he is thinking the conclusion that what he is is a thinking thing (*res cogitans*), but rather that he has inferred (whether legitimately or not) from that fact that he is thinking the conclusion that what he is is a thinking (*cogitans*). Descartes's way with the charge is interesting. Insisting (quite correctly) that the participle *cogitans* is ambiguous in Latin between the act of thinking and the one thinking – the thinker – he asserts indignantly that his use should be understood in the second way, so that *cogitans* is understood as equivalent to *res cogitans* and so to describe something as *cogitans* is to pick it out as a bearer of modes and acts. Descartes does not deny, as Hobbes would have him do, the identity of a substance with its essence (again a common late Scholastic doctrine, though one problematic for Hobbes himself and for many Thomists). Instead, he insists that, in the relevant sense, to be *cogitans* is to be a substance. Thus the exchange with Hobbes proceeds much as one would expect if Descartes were assuming that an attribute like *cogitans* is (also) a subject. *Pari ratione* the same should hold for extension.

There is one further consideration which points toward the conclusion that extension is not a feature of something other which underlies it. It is that Descartes does not seem to have a positive conception of substance distinct from its attributes and so there is nothing positive which *res cogitans* and *res extensa* have in common – the *res* present in both seems to do no work other than to insist, against the likes of Hobbes, that we are not here talking about a feature of anything and so (as Descartes suggests in *Principles* I, 51) the concept of finite substance tells us only that nothing other than God is required for its existence.

I think the real ground of opposition to the idea that body just is extension is the philosophical worry that to accept it is to make a category mistake. My own worry is that, at least in the context of Descartes's thought, it would be a philosophical mistake not to accept it. Suppose we hold that matter is not extension but something extended – some stuff which is logically prior to its being extended. Now, as Helen Cartwright

pointed out, there is a problem comparing amounts of stuff. She gives the example of a recipe which says "Take equal parts of flour and Colman's mustard." Suppose that I take a teaspoon of each and you take an ounce of each. Have we both followed the recipe? A teaspoon of mustard weighs more than a teaspoon of flour, so by my measure you have taken more flour than mustard and by yours I have taken more mustard than flour. Contrast a book on bribes which says "Be sure to give equal amounts of gold to the king and the bishop." Here it doesn't matter what measure I use. I can bring each a pound of gold, a cubic foot of gold, or whatever. Notice that I can't do this if the book says "Be sure to give equal amounts of shiny stuff to the king and the bishop." Do I follow that advice if I give one a cubic foot of gold and the other a cubic foot of glass beads, or if I give one a kilo of gold and the other a kilo of glass beads, or . . . ? Gold is not golden stuff any more than it is shiny stuff. It is a kind.

Now consider Descartes's wax example in the Second Meditation. Descartes puts the wax near the fire, it melts, and its size (*magnitudo*) increases.

Sed ecce, dum loquor, igni admovetur: saporis reliquiae purgantur, odor expirat, color mutatur, figura tollitur, crescit magnitudo.

[But even as I speak, I put the wax by the fire, and look: the residual taste is eliminated, the smell goes away, the color changes, the shape is lost, the magnitude increases.] (2:20; AT 7:30)

Its size has changed. Has its *extensio* changed? Grant that the matter we are supposing is essentially extended, does this mean it essentially has a fixed volume? What does it mean? Eventually, though not in the *Meditations*, Descartes explains how the size of wax can change though the *extensio* does not. His explanation is that when wax melts little bits of other stuff come between the wax bits so that while the wax bits are just the same bits as before they are further apart from each other than before. The wax has the same extension. But what can this mean? We can imagine a situation (in a vortex, for example) where no matter how finely we divide we always find bits of non-wax between bits of wax. What extension would the wax have then?

The proposal I endorse avoids all these problems. On that proposal a body is a quantity, a volume if you like, and volumetric measure is the measure of it. On this proposal "extension," like "gold," is a kind term and just as, intuitively, given that Descartes is no atomist, I could take an ounce (or a teaspoon!) of my gold and mix it with your gold as finely as you please without affecting the amount of gold that is mine, I suggest I can take a given amount of extension and mix it as finely as you please with extension which was not in that amount without thereby changing the amount of the original extension.

Bodies and Extended Substances

If extended substance and extension are identical for Descartes, what of extensions? Can we legitimately claim that just as Descartes draws no distinction between extension

and *res extensa*, so he draws no distinction between a particular extension and a particular *res extensa*? Can we pursue this line of thought to the conclusion that each extension is for him a distinct extended substance? And what of bodies? Are bodies extended substances and so extensions?

If we turn again to *Principles* II, 8 we seem to find Descartes identifying a particular continuous quantity, i.e., a particular extension, with a particular extended substance:

In reality, however, it is impossible to take even the smallest fraction from the quantity or extension without also removing just as much from the substance; and, conversely, it is impossible to remove the smallest amount from the substance without taking away just as much from the quantity or extension.

It is in the very next passage, at the beginning of *Principles* II, 9, that he insists that those who make a distinction between substance and extension are confused. *Prima facie* then, we have reason to think Descartes does identify particular extended substances with particular extensions. Before we can explore this issue further, though, something must be said about the relation between body and extended substance. Something must be said because the discussion of whether we are to understand Descartes to be maintaining that there is one extended substance or that there are many has been bedeviled by assumptions about the relation between body and extended substance – and so, if I am right, by assumptions about the relations between body and extension.

Let me start then with the question whether sameness and distinctness of extension give us sameness and distinctness of bodies. Descartes is remarkably reticent about issues of individuation in general. He never, for example, gives us anything like a criterion of individuation for minds. When it comes to bodies he is a bit more forthcoming. One of the most explicit discussions is in his letter to Mesland of February 9, 1644. There he distinguishes two senses of “body” (*corps*). In one sense, when we speak of “*corps en general*,” Descartes says, a body only remains totally the same, so that we can speak of it as *idem numero* – that is, as numerically the same – when each bit of the matter which makes it up is the same. In the other sense, when we speak of the body of a human, we say we have the same body so long as we speak of what is united with the same human soul. In this sense, it seems, entirely different parts of matter could be united with the same soul at different times and yet be the same (human) body.

In the case of body in general, then, the criterion of sameness of body is sameness of the parts which make up the body, and – no surprise if what was said above about quantity, extension, and *res extensa* is correct – sameness of parts is spoken of as sameness of the quantity which makes up the body. Is body, understood in this way, substance? If so, how many such substances are there?

This issue is one way of getting at the question of how many extended substances Descartes thinks there are, but it is not exactly the same question because, I think, the question of how many extended substances there are has been bedeviled by the assumption that if there are many extended substances, for Descartes, they will be bodies not in the technical sense in which Descartes speak of a body in general in the Mesland

letter, but either in the sense in which we speak of bodies in everyday life – tables, chairs, and the like – or in the more technical but still distinct sense in which Descartes speaks of bodies in *Principles* II, 25, when he says:

By one body or one part of matter, I understand all that which is transferred together even though this may in fact consist of many parts which have other motions in themselves. (AT 8A:53–4; trans. alt.)

It has often been supposed that the condition of which Descartes speaks here – the condition of being an ensemble of matter or extension with a common motion – is one which Descartes thinks is a metaphysical criterion of individuation for extended substances. I do not think this likely because there is a philosophical problem with individuating extended substances by motion, a problem to which I think Descartes would have been very sensitive. Suppose we think that it is criterial for bodies that they have a single motion so that if the entire universe were at relative rest there would be only one body. Well then, a single body has a single motion. But motion is at best a mode for Descartes and a mode is always a mode *of a substance* and ontologically dependent on that of which it is a mode. If we take individuation seriously – as a metaphysical rather than an epistemological matter – we must admit a puzzle about how something can be made to be what it is by something logically posterior to it and ontologically dependent on it.

Moreover, Descartes claims that motion is relative. The relativity of motion means that a motion-mode is no more found in a given body than it is in the other bodies relative to which we say the given body is moving. This implies that we can individuate bodies by their motion only relative to other bodies which we have already so individuated. Again, this is not an insuperable epistemological problem, but if individuation were a necessary metaphysical condition of being a substance it would vitiate the whole enterprise.

What then is Descartes doing in *Principles* II, 25? I suggest that he is not defining “body,” but rather picking out the bodies which are the relevant ones for his physics. Descartes’s laws of motion apply precisely to bodies in the sense of *Principles* II, 25 – that is to items which have a common motion and which are themselves in motion relative to one another. But if we deny that motion can individuate bodies are we not left without a way of doing so and does not that drive us to the conclusion that there is just substantial body for Descartes – namely, the whole of extended substance?

I say not. Even if we grant that what Descartes says in the Mesland letter about body in general is, if taken as criterial, ungrounded – because it gives a condition for sameness of body in terms of parts which are yet other bodies and so presupposes that we can already individuate bodies at some level – that is compatible with the idea that it is bodies in this sense – quantities to which every part is essential – that are extended substances for Descartes. The reason that these two ideas are compatible is that we need not suppose that Descartes thinks criteria of individuation can be supplied for substances at all. He never supplies criteria of individuation for minds and this has not led very many to suppose he thinks there aren’t distinct minds. Why should taking bodies in the sense of parcels of extension/matter to which every part is essential require anything more? The search for criteria of individuation is only to the point if you think that

individuals have to be made individual. I suggest that Descartes is content to take the individuality of basic objects as primitive.

If the line of thought I have been pursuing so far is on the right track, Descartes thinks that the material universe consists of matter or extension or of body (we can speak indifferently of any of these) and that the bodies of Cartesian physics as well as the human body and the material objects of daily life are not material substances. What then is the material substance or the material substances to which Descartes so often refers?

I suggest that there are many material substances in Descartes's universe and that they are neither the bodies of his physics nor ordinary material objects. They are bodies in the sense of "body" which Descartes has in mind in his discussion of "body in general" in the Mesland letter; these are (to use a word I borrow from Helen Cartwright, who in turn borrowed it from Russell, who in turn . . .) "quantities."

There is very little direct textual evidence for a monist position in Descartes. There are no texts in which he denies that there are many extended substances and there are a large number in which he speaks more or less casually about substances in the plural. Monism is an interpretive position whose strength has come from the supposed weakness of its alternatives. Once one abandons the thought that the only alternative to monism is to suppose either that a chair, a table, or a stone really are three separate extended substances or that the bodies which collide in Descartes's physics are separate substances, monism loses some of its charm.

The alternative I propose is that each quantity or parcel of matter is a substance in its own right, that what I am calling quantities of matter do not have extrinsic criteria of individuation any more than individual minds have, and that the same body in the ordinary sense can be made up of different quantities of matter at different times.

In the *Principles* Descartes famously writes:

For example, even though we may not yet know for certain that any extended or corporeal substance exists in reality, the mere fact that we have an idea of such a substance enables us to be certain that it is capable of existing. And we can also be certain that, if it exists, each and every part of it, as delimited by us in our thought, is really distinct from the other parts of the same substance. (1:213; AT 8A:28)

Descartes is quite explicit that there are in fact indefinitely many actual parts of matter. Speaking of the motion of a vortex which is not perfectly circular, he writes that

what happens is an infinite, or indefinite, division of the various particles of matter; and the resulting subdivisions are so numerous that however small we make a particle in our thought, we always understand that it is in fact divided into still smaller particles. (*Principles* II, 34; 1:239)

Descartes emphasizes that this is a case of real and not merely potential division by adding that in order to produce the "narrow" part of an irregular vortex

it is necessary that all its imaginable particles, which are in fact innumerable, should shift their relative positions to some tiny extent. This minute shifting of position is a true case of division. (*Principles* II, 34; 1:239)

One might think that this settles the matter. Descartes is explicit that real distinguishability is the criterion for distinctness of substance and he is explicit that any part of matter is really distinguishable from any other. What could prevent our drawing the conclusion then that any two quantities of matter or extension are distinct substances?

Well, one might wonder, in view of *Principles* I, 51, whether the existence of a given quantity of matter is sufficiently independent of the existence of the rest of the quantities of matter in order for the former to count as a substance. To be clear, the problem is not that any quantity of matter is not really distinguishable from any other particular one; it is whether any quantity is really distinguishable from all others (taken together). Descartes is clear that extended substance considered as a whole is indefinitely large (*Principles* II, 21). He is also clear that the notion of a vacuum properly speaking is “repugnant to reason” (*Principles* II, 16). Nothing in that is inconsistent with the universal medieval view that God by his omnipotence could simply annihilate something – say, my left hand. Given Descartes’s other views it would follow (as he points out in *Principles* II, 34; 1:231) that were God to do so there would simply be nothing between the end of my forearm and the surrounding air; the two would be in contact. There does not seem to be anything impossible about that. Similarly, God could, apparently without contradiction, annihilate the very bit of extension which is now my left forefinger, or an arbitrarily determined volume of it.

The problem lies in the other direction. Descartes claims that it is impossible for God to have made only a definite amount of extension so that it seems he could not either have made only the matter of one finger or annihilate all matter except that parcel. In that case there remains the question of what Descartes would have made of the conundrum. Note that there is no particular other quantity of matter that God could not conserve a finger without, it is only the question of whether the existence of this parcel presupposes the existence of some indefinite parcel or other which is so puzzling.

This puzzle is a problem for my proposal only if we understand the criterion of substancehood which Descartes provides in *Principles* I, 51 to mean that if A is a created substance then God can create it alone without creating any other substance whatsoever. The criterion certainly admits of this interpretation, but it does not require it. It can be understood to mean that if A is a particular created substance, then God can create it without creating any other particular substance. So understood the dependence of a particular extension upon an indefinitely large one does not violate the criterion, since while apparently God cannot create the extension which is now my left forefinger without creating an indefinitely large extension, there is no particular indefinitely large whole whose existence my left forefinger’s quantity requires; any will do.

This solution requires that we not think of any particular quantity (including the actual indefinitely large one) as individuated solely by its relations to others, but that dovetails nicely with the second part of the proposal – that individual parcels of matter are primitively individuated in the same way that it seems Descartes thinks individual minds are. That individual quantities of matter are primitively individual is not to deny that they are essentially dependent upon the very parts that they have.

Bodies, Space, and the Ontology of Everyday Life

Suppose now that the picture of material substance I have been painting is correct. What then are the bodies of Descartes's physics and the objects of everyday life? The answer to this question is, I suggest, closely connected with the relation between extended substances and space.

Descartes does not have our post-Newtonian conception of space. Instead he distinguishes two concepts: internal place and external place. He calls internal place "space" (*spatium*) but external place is in some ways closer to our more familiar notion.

He defines internal place in *Principles* II, 10, claiming that:

Space or internal place, and corporeal substance contained in it do not differ *in re* but only in the way we are used to conceiving them. (AT 8A:45; my translation)

Descartes's doctrine here is traditional. He is following a line of thinkers, which includes Bacon, Ockham, Buridan, and Suárez, in claiming that internal place just is the extended substance itself. Because the internal place of a quantity of extension just is that extension itself, it moves with the extension.

In *Principles* II, 15 he identifies external place as the inner surface of the surrounding bodies (a picture due to Aristotle). Whereas, for him, the internal place of a body is just the extension or the body itself, his doctrine of external place is more complicated because he wants to argue both that an empty space is inconceivable – so that we cannot conceive of a space apart from a body occupying it – and yet that the same space need not be occupied by the same body at different times.

Margaret Wilson (1978: 86–7) follows a tradition which includes Rodis-Lewis when she suggests that Descartes describes the relation between space (in the sense of external place) and body as like that of species to individual, but I think that the talk of genus and singular obscures it, at least for us, and that although Descartes speaks here of our considering the body as a singular and the space as having only a generic unity, we can get a firmer grip on what he has in mind if we think of a description like "Prime Minister of Canada." That description was first satisfied by John A. Macdonald, later by Wilfrid Laurier, still later by Mackenzie King, and so on. It was the same office they all held and while each at the time he held the office was identical with the Prime Minister of Canada, different people have been the Prime Minister at different times. Similarly, when a body is located just so among others it is a specific (possibly discontinuous) space. Different bodies can *be* the same space on different occasions. The criteria for being the same body are different from the criteria for being the same space.

What now of the relations between extended substances and ordinary material objects?

The first thing to be said is that while Descartes sometimes calls ordinary material objects *substances*, he does not mean that they are substances in his technical sense. For example, in his Broadside against Regius he writes:

we should note that in subjects which are composed of several substances, one such substance often stands out; and we view this substance in such a way that any of the other substances which we associate with it are nothing but modes of it. Thus a man who is

dressed can be regarded as a compound of man and clothes. But with respect to the man his being dressed is merely a mode, although clothes are substances. (1:299; AT 8B:351)

If we take the references to substance and modes here seriously we shall have to conclude that the same thing can be both a substance and a mode! But Descartes explicitly rejects this. Indeed, in the same reply to Regius's Broadsheet he says clearly:

When he says that the nature of things leaves open the possibility that the same thing is either a substance or a mode what he says is quite self-contradictory, and shows how irrational his mind is. (1:300; AT 8B:352)

So it seems clear that he does not think that whether something is a substance or a mode in a strict sense can depend on our (contingent) way of regarding it.

Not all the bodies of daily life are on the same footing for Descartes. I suggested earlier that Descartes does not see the need for a criterion of identity either for souls or for the true extended substances. He clearly does see the need for, and supplies, such a criterion for the human body, however. As he explains in the letter to Mesland, a human body is "just the whole of the matter joined to the soul of that man" (3:243; AT 4:166).

What this makes clear, I think, is that what individuates human bodies is the presence of a soul. This does not mean that there are not usually other features characteristic of a human body. In Part I, 30 of *Passions of the Soul*, for example, Descartes emphasizes that

the body is a unity which is in a sense indivisible because of the arrangement of its organs these being so related to one another that the removal of any one of them renders the whole body defective.

The difference between a living and a dead body is that in the latter "one of the principal parts is decayed" (Part I, 6), a situation which causes the soul to cease to be united. But what transubstantiation shows is that it is possible for a soul to be united to matter which either is not organized the way a functioning human body is organized, or only has that organization in a bizarre fashion which leaves the surface of the matter entirely like that of a piece of bread or drop of wine. Thus, although the human body has a certain organization, it is not metaphysically necessary that something have that organization to count as a human body.

One consequence of all this, I think, is that one cannot conceive of a human body *qua* human body apart from a soul. This is not to say that one cannot conceive of the matter which momentarily is a human body apart from a soul and it is not to say that one cannot conceive what a living and a dead human body have in common apart from the soul. But when we conceive of a human body as such we conceive it as united to a soul. That is why there is such an intimate union between the body and soul.

The human body is a very special case. In that special case we are provided with a criterion of individuation which is independent of our interests. Where the individuation of non-human bodies (in the ordinary sense of "bodies") is concerned, criteria of individuation often seem more dependent on us. Look again at Descartes's comments on Regius's Broadsheet:

we should note that in subjects which are composed of several substances, one such substance often stands out; and we view this substance in such a way that any of the other substances which we associate with it are nothing but modes of it. Thus a man who is dressed can be regarded as a compound of man and clothes. But with respect to the man his being dressed is merely a mode, although clothes are substances. (1:299; AT 8B:351)

This passage is interesting in several respects. First, Descartes explicitly refers to subjects composed of several substances. Second, he does not say (of course) that the clothes are a mode of the man, but that they may be *viewed* or *regarded* this way. There is in Descartes a tendency to the view that we make objects by projecting criteria of unity. In the passage just quoted he speaks of our making a unity of the man and his clothes.

In an interesting passage on love in the *Passions of the Soul* he speaks of love as “an emotion . . . which impels the soul to join itself willingly to objects that appear to be agreeable to it” and he glosses the “willingly” thus:

Moreover, in using the word ‘willingly’ I am not speaking of desire, which is a completely separate passion relating to the future. I mean rather the assent by which we consider ourselves henceforth as joined with what we love in such a manner that we imagine a whole, of which we take ourselves to be only one part, and the thing loved to be the other. (1:356; AT 11:387)

It would be tempting to go so far as to suggest that the kind of substantial union the human soul has with the human body involves some of the same factors. But we must be cautious. Descartes insists (notably against Regius) that the human being is a substance and he never suggests that we make substances by thinking of things as substantial. He only suggests that we can consider or regard them as such.

But Descartes does not always speak of substances and modes strictly. He often calls ordinary bodies “substances” and he speaks of them as getting their names from the way they appear to us (3:285; AT 4:375). It is not plausible to suppose that the constitutive differences of all of the kinds of bodies we distinguish are in any significant sense up to us. Nature is, after all, the work of a divine artificer. Yet much is up to us and to the extent that the distinctions among bodies are a function of our interests, we can reasonably suggest that what there is in the Cartesian ontology of everyday life is to some extent a matter of what we put there.

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Chapter 17

The Role of God in Descartes's Philosophy

JOHN COTTINGHAM

Introduction: The Cartesian Image

Each age tends to reinterpret or refashion the ideas of the great canonical philosophers for its own purposes, and the ideas of Descartes have not been exempt from this process. Indeed, perhaps more than any other major thinker, Descartes has become a kind of philosophical icon, displayed in the textbooks and commentaries of the last hundred years or so in a confusing variety of guises. In a version of the history of ideas that was widely promoted some decades ago, he figured as the archetypal “rationalist” metaphysician, attempting to spin out a whole deductive system of philosophy and science *a priori*, from premises derived entirely from inner reflection. In the “linguistic” phase that gripped philosophy in the wake of Wittgenstein, he was pilloried as the supposed advocate of the fallacy that language and thought can occur within a wholly subjective or private domain. And in the “naturalistic” turn that has characterized much of the more recent philosophical past, he is routinely lambasted as the champion of a dualistic theory of the mind – the view that consciousness is a wholly immaterial phenomenon, entirely attributable to a non-physical soul.

These images of Descartes are all questionable, but that has not prevented their gaining a secure place in the set of default assumptions which condition how students and scholars use the label “Cartesian.” In reality, the “rationalist” image is belied by the importance Descartes himself gave to experimentation, and to empirical hypotheses tested against experience (Clarke 1982; Cottingham 1992); the image of Descartes's philosophy as starting from a domain of private or subjective ideas is belied by his belief in an objective realm of meaning (Cottingham 1998a); and the “dualist” label, though containing undeniable elements of truth, needs much qualifying when we start to look at Descartes's own insistence on the embodied nature of much of our human experience, in particular our feelings and emotions (Cottingham 1998b).

Alongside these specific interpretations and counter-interpretations of various aspects of Descartes's philosophy, there is an interesting general question that all who approach the thought of “the father of modern philosophy” must sooner or later confront: what exactly did Descartes himself chiefly take himself to be doing – what was his self-image as a philosopher? For many modern generations of students brought up on standard “Introduction to Philosophy” courses, the answer is obvious: he is

primarily an “epistemologist” – that is, he wanted to establish what, if anything, can be *known* for certain. On this view, the most important questions in Cartesian philosophy are questions like “Are the senses reliable?” “Can I really know whether I am awake or asleep?” “Are judgments like ‘two plus two makes four’ immune from error?” And “Can I be certain of the existence of an external world?” More recently, the image of Descartes the epistemologist has partly given way to that of Descartes the scientist: the puzzles in the *Meditations* about illusions and dreaming, and the malicious demon bent on deceiving us, are (on this view) simply a preliminary to the building of a new scientific system, offering a complete set of explanations of the nature of the universe, and everything within it (Wilson 1979; Garber 1992; Clarke 2003).

These general accounts of the Cartesian project have much to tell us, though they also need to be treated with caution if they are supposed to give us “the key” to Descartes’s philosophy. René Descartes was one of those very few philosophical giants – perhaps two or three emerge each century, if we are lucky – whose genius defies easy classification, and whose thought is sufficiently original and challenging to resist boiling down to a simple set of aims and objectives. For the purposes of the present chapter, however, I want not so much to criticize any of the above interpretative accounts as to draw attention to something that is curiously absent from all the iconic images of Descartes so far mentioned.

Someone casting an eye over the various images sketched above might be forgiven for supposing that Descartes, however interpreted, is above all a *secular* philosopher. A *priori* system-builder, advocate of “Cartesian privacy,” philosopher of mind, epistemologist, proto-scientist – all these images fit, for the most part, as models or as targets, within the agendas of the modern Anglophone philosophical academy. But if readers who are new to Descartes pick up any one of his great masterpieces, the *Discourse*, the *Meditations*, or the *Principles*, they will be surprised to find that what has pride of place in the construction of his philosophical system is something that is almost never found in today’s typical research agendas – an appeal to God. Within contemporary philosophy departments there are still, of course, a considerable number of academics who discuss arguments for God’s existence and other topics concerned with religious belief; but their work, for the most part, occurs within the confines of a specialized branch of philosophy called “philosophy of religion,” and as a general rule it tends not to spill over into the content of the “mainstream” arguments and debates that preoccupy those working in the rest of the subject. For Descartes, by contrast, the nature and existence of the Deity is something that lies at the very heart of his entire philosophical system – something without which it would be entirely unrecognizable.

The Eclipse of God in Conceptions of Cartesianism

How is it, then, that something so central to Descartes’s philosophy has faded, to a greater or lesser extent, from our contemporary images of his work? One answer has already indirectly been alluded to, and is connected with the “naturalistic revolution which has swept Anglophone philosophy over the last three decades” – a revolution inspired by the vision that philosophers should “either . . . adopt and emulate the method of successful sciences, or . . . operate in tandem with the sciences, as their

abstract and reflective branch” (Leiter 2004: 2–3). The considerable number of present-day philosophers who subscribe to this scientistic vision of how philosophy should proceed may (insofar as they pay any attention to the history of their subject) have some interest in Descartes’s views on scientific method, or the criteria for knowledge, or his discussions on, for example, the relation between human and animal capacities and faculties; but his arguments and assertions about God are elements they are inclined to ignore, either as irrelevant to the central core of modern mainstream philosophy, or, perhaps, as what they take to be an embarrassing hangover from the medieval worldview that still conditioned the way Descartes was brought up.

Alongside this “modern” secularist motive for sidelining the religious elements of Descartes’s philosophy, there has been, from the other side as it were, a considerable resistance to accepting him as the devoutly religious philosopher that his frequent and often reverential references to God would suggest him to be. Historically, the Catholic Church, of which Descartes was all his life a member, has been highly suspicious of Cartesian philosophy, regarding it as unorthodox and potentially subversive of the faith. Soon after his death, Descartes’s writings were placed by the Church on the Index of prohibited books; and in the succeeding centuries “the image of Descartes as an anti-clerical and indeed anti-religious force,” even though “deeply contrary to his actual disposition” (Williams 1978: 24), was to prove remarkably resilient. The factors behind this erroneous ecclesiastical view of Descartes as a danger to religion are many. In the first place, he was associated with Galileo as a supporter of the “new,” sun-centered cosmology that was *prima facie* in conflict with biblical statements apparently implying a fixed and central Earth; and although Descartes prudently refrained from publishing his treatise on “The Universe” (*Le Monde*) following the condemnation of Galileo by the Inquisition in 1633, and despite the fact that he concluded his eventually published major textbook *The Principles of Philosophy* (*Principia philosophiae*, 1644) with a statement of submission to the authority of the Church, his maneuvers could not entirely shield him from suspicion in the tense and confrontational religious climate of the seventeenth century.

A more technical dogmatic issue that was to embroil Descartes during his own lifetime was that of transubstantiation (the doctrine that the bread and wine of the Eucharist are changed into the body and blood of Christ). The problem here was that Descartes aimed to replace the traditional Aristotelian philosophy of physics, which had dominated medieval thought, with a new geometrical conception of matter as consisting simply of extension in length, breadth, and depth. The Church had used the standard Aristotelian concepts to explain how the “substance” of the bread changes into the body of Christ, while the “accidents” (the color, smell, taste, etc. of the bread) remain unaltered, and it was wary of allowing a new schema of physics that might sweep all this away. Descartes protested that his new physics was quite compatible with the divine “miracle of transubstantiation” (2:177; AT 7:254), but the controversy continued to grind on throughout the remainder of the century (Gaukroger 1995: 357).

Nowadays, of course, the Church has no problem with a sun-centered planetary system, nor would it regard the mathematicization of physics as threatening the doctrine of the Eucharist; but, for all that, the received ecclesiastical image of Descartes remains, in many quarters, distinctly negative. In a set of reflections published in the

year of his death, Karol Wojtyla, the late Pope John Paul II, pointed to a period of moral disintegration that had characterized much of the twentieth century, with first the rise of totalitarianism, and later the erosion of traditional family values; and, perhaps surprisingly, he went on to trace the philosophical roots of this moral collapse to some of the central ideas put forward by Descartes. The rot started, he argued, with the way Descartes constructed his philosophy, basing it on the foundation of individual self-awareness, the famous *Cogito ergo sum* ("I am thinking, therefore I exist"):

The *Cogito ergo sum* radically changed the way of doing philosophy. In the pre-Cartesian period, philosophy, that is to say the *Cogito* ('I am thinking') or rather *Cognosco* ('I acquire knowledge') was subordinate to *esse* [being], which was considered primary. For Descartes, by contrast, *esse* appeared secondary, while he viewed the *Cogito* as primary. This . . . marked the decisive abandonment of what philosophy had been hitherto, particularly that of St. Thomas Aquinas . . . [For Aquinas] God as fully self-sufficient being (*Ens subsistens*) was considered as the indispensable support for every *ens non subsistens*, for every *ens participatum*, that is to say, for every created being, and hence for man. The *Cogito ergo sum* carried within it a rupture with this line of thought. The *ens cogitans* (thinking being) thus became primary. After Descartes, philosophy became a science of pure thought: all that is *being* – the created world, and even the Creator, is situated within the ambit of the *Cogito*, as contents of human consciousness. Philosophy is concerned with beings as contained in consciousness, and not as existing independently of it. (John Paul II 2005: 9)

The orientation alluded to here, centered on the contents of personal consciousness rather than an independent external reality, is indeed one prominent strand in twentieth-century philosophical thought, found most notably in the school of "phenomenology" founded by Edmund Husserl, whose *Cartesian Meditations* (1931) had argued that "By my living, by my experiencing and acting, I can enter no world other than the one that gets its sense [*Sinn*] and validity [*Geltung*] in and from me, myself" (Husserl 1988: ch. 1, §8). Such an autocentric vision may indeed be seen as sinister, if it is taken to give primacy to individual consciousness in a way that threatens the existence of objective value and meaning; but a careful reading shows that it is anachronistic to retroject this conception back on to Descartes himself.

Descartes, to be sure, did begin his search for truth by establishing the indubitable certainty of his own existence. As he puts it in Part Four of his intellectual autobiography, the *Discourse on the Method*, "seeing that this truth, *I am thinking therefore I exist*, was so firm and sure that even the most extravagant suppositions of the sceptics were incapable of shaking it, I decided that I could accept it without scruple as the first principle of the philosophy I was seeking" (1:127; AT 6:32). Yet it simply does not follow that the "I" so discovered is "primary" for Descartes, in the sense that it no longer needs the support of a self-subsistent creator, on which traditional theology had insisted. On the contrary, whenever Descartes discusses his *Cogito* argument, he stresses the frail, temporary nature of his self-awareness: "I am, I exist – that is certain. But for how long? For as long as I am thinking. For it could be that were I totally to cease from thinking, I should totally cease to exist" (2:18; AT 7:27). Not only is such self-awareness a tiny flickering candle of certainty that could be extinguished at any minute, but Descartes soon proceeds to use this very fragility of his thinking as a decisive indicator of his complete dependence on a power greater than himself:

A lifespan can be divided into countless parts, each completely independent of the others, so that it does not follow from the fact that I existed a little while ago that I must exist now, unless there is some cause which as it were creates me afresh at this moment – that is, which preserves me. For it is quite clear to anyone who attentively considers the nature of time that the same power and action are needed to preserve anything at each individual moment of its duration as would be required to create that thing anew if it were not yet in existence. (Third Meditation, 2:33; AT 7:49)

For Descartes, my own existence may be the first thing I come to know, but as soon as I reflect on it I see that I could at any moment slip out of existence were there not an independent sustaining force to preserve me. I owe my being to God, the infinite creator of all things; and indeed Descartes argues that the initial act of creation is only verbally or conceptually distinct from the same eternal and perpetual divine action whereby I am “preserved” in every single moment of my existence.

To guard against the pervasive, but profoundly mistaken, “subjectivizing” interpretation of Cartesian philosophy, we need to observe a crucial distinction which Descartes himself insisted on, in an interview he gave to a young Dutch disciple, Frans Burman, in 1648: “the method and order of discovery is one thing, that of exposition is another” (3:338; AT 5:153). A similar distinction is made in a much earlier work, the *Regulae* or *Rules for the Direction of our Native Intelligence* (ca. 1628), between “considering things in accordance with the way that corresponds to our knowledge of them” and “considering things in accordance with how they exist in reality” (1:44; AT 10:418). In his metaphysical masterpiece, the *Meditations*, Descartes expects the reader to follow him along a subjective path of discovery: he begins his meditations “quite alone” (2:12; AT 7:18), asks what, if anything, he can be certain of, arrives at the indubitable *Cogito*, and then proceeds to acknowledge the existence of his creator. As he put it earlier in the *Regulae*, “Sum, ergo Deus est” (“I am, therefore God exists”; 1:46; AT 10:422). But the priority of the self over God is simply an *epistemic* priority. Descartes, as St. Augustine had done many centuries before, descends into his own interior self in order to discover his creator; but none of this denies the genuine priority of God in the “order of exposition” – that is, the order which one would follow in expounding things in accordance with their status in reality. So far from initiating a “rupture” with tradition, Descartes is here following a traditional line, going back to Aristotle, and further articulated by the great Christian philosopher Thomas Aquinas in the thirteenth century, when he distinguished matters that were “prior from our point of view” (*priora quoad nos*) from those that were “prior in themselves” (*priora simpliciter*) (Aquinas 1911: Part Ia, qu. 2, art. 2). Epistemically, the route may be from knowledge of self to knowledge of God (though even here the transition to God is, for Descartes, swift and inevitable); ontologically, by contrast, God retains absolutely primacy. As Descartes makes clear in the Third Meditation, the infinite substance that is God has “more reality” than a mere finite substance such as myself. My very recognition of my own imperfection (which may come first in my order of discovery) already presupposes the ontological priority of this greater and more perfect reality:

I clearly understand that there is more reality in an infinite substance than in a finite one, and hence that my perception of the infinite, that is God, is in some way prior to my perception of the finite, that is myself. For how could I understand that I doubted or desired

– that is lacked something – and that I was not wholly perfect, unless there were in me some idea of a more perfect being which enabled me to recognize my own defects by comparison? (Third Meditation, 2:31; AT 7:46)

But what, to conclude this section, shall we say of John Paul II's remark, quoted above, that in Descartes's philosophy even the creator is situated "within the ambit of the *Cogito*"? Epistemically, perhaps, that is right, insofar as the Cartesian meditator reviews the ideas he finds within himself, and isolates one, the idea of God, for special inquiry. But Descartes's method in the Third Meditation is precisely to focus on the content of that idea as demonstrating that it could *not* have been constructed from his own resources as a thinking ego, but requires the real existence of a self-sufficient author, who "in creating me, placed this idea in me to be, as it were, the mark of the craftsman stamped on his work" (2:51; AT 7:51). The whole procedure is explained by Descartes with great precision in his later work, the *Principles of Philosophy*, where the ontological primacy of God is made crystal clear:

There is a great advantage in proving the existence of God by this method, that is to say, by means of the idea of God. For the method enables us at the same time to come to know the nature of God, insofar as the feebleness of our nature allows. For when we reflect on the idea of God which we were born with, we see that he is eternal, omniscient, omnipotent, the source of all goodness and truth, the creator of all things, and finally, that he possesses within him everything in which we can clearly recognize some perfection that is infinite or unlimited by any imperfection. (*Principles*, Part I, art. 22, 1:200; AT 8A:13)

The Fountain of Science

The Cartesian argument just referred to, sometimes known as the "trademark argument," is Descartes's principal tool for moving from self-awareness to knowledge of God. His idea of infinite being has a certain representational content, he reasons, which cannot be explained as the production of his own finite and limited mind: the cause of the idea must have as much perfection as is found represented in the content of the idea, and hence that cause must indeed be an "infinite, eternal, immutable, independent, supremely intelligent, supremely powerful substance, by whom all things were created" (2:31; AT 7:45). Complex in its fine detail, and involving some controversial assumptions about causality, this argument has been subjected to a barrage of criticism by commentators (Kenny 1968; Williams 1978). But even if not so transparent as to command universal assent, "even among the Turks," as Descartes hoped his arguments would do (3:342; AT 5:159), it nevertheless points to a fascinating aspect of our human conception of that infinitude that is called "God": the infinite is a concept that we both clearly understand, and yet at the same time recognize as being "beyond us" – as eluding our full mental grasp. As Descartes put it, "it does not matter that I do not grasp [*comprehendere*] the infinite, or that there are countless additional attributes of God which . . . perhaps I cannot even reach in my thought" (2:32; 7:46); it is enough that I understand it – just as I can touch a mountain, without being able to grasp it, or put my arms round it (3:25; AT 1:152). Our human conception of God, as is recognized

in a long tradition going back to St. Bonaventure in the thirteenth century, and beyond, is a conception of something infinitely beyond us, the understanding of which is intimately linked to awareness of our own weakness and finitude (*Itinerarium* (1259), in Bonaventure 1891: Pt. III, §3).

One way in which we aspire to transcend that finitude is by using the faculty of reason that differentiates our species, that gift which Descartes, again following a long tradition, regarded as a light shining in each human soul (the *lumen naturale*, or *lux rationis*, the divinely bestowed “natural light” or “light of reason”). Yet Descartes’s ambitious project of founding a new philosophical and scientific system will not be satisfied with isolated flashes of rational illumination such as “if I am doubting, then I must exist.” His aim is to use such flickering intuitions to light a whole blazing bonfire that will “bring to light the true riches of our souls, opening up to each of us the means whereby we can find . . . all the knowledge we may need for the conduct of life,” and “the means of using it in order to acquire all the most abstruse items of knowledge that human reasoning is capable of possessing” (2:400; AT 10:496).

Such a project, as Descartes himself acknowledged, might seem so grandiose as to forfeit all credibility (*ibid.*). But here again the appeal to God emerges as the key to progress. For after reaching an awareness of God, and having “gazed with wonder and adoration on the beauty of this immense light, insofar as the eye of my darkened intellect can bear it” (Third Meditation, 2:36; AT 7:52), the Cartesian meditator announces that “from the contemplation of the true God, in whom all the treasures of wisdom and the sciences lie hidden,” he thinks he can see a way forward to the knowledge of other things (2:37; AT 7:53).

The phrase just quoted, from the opening paragraph of the Fourth Meditation, is, in the Latin wording of Descartes’s original text, an almost exact citation from the Bible. In his letter to the Colossians (2:3), St. Paul had talked of “the mystery of God and of the Father and of Christ, *in whom are hid all the treasures of wisdom and knowledge*” (*in quo sunt omnes thesauri sapientiae et scientiae absconditi*). Descartes, many of whose contemporary readers would have instantly recognized the reference to the Vulgate (the standard Latin text of the Bible), subtly changes the singular *scientiae* (“knowledge”) to the plural *scientiarum* (“sciences”). For St. Paul, God (in Christ) is the mysterious source of all wisdom; for Descartes, reaching knowledge of God opens the path to “the sciences” – to true scientific understanding.

“The Sciences” is something of a catch-phrase in Descartes’s thought. In his early notebooks, written about the time of his travels in Germany as a young man, when a day’s meditations in a “stove-heated room,” followed by a night of disturbed dreams, had given him the conviction that he was destined to found a new philosophical and scientific system, Descartes wrote that “the sciences are at present masked, but if the masks were taken off, they would be revealed in all their beauty” (1:3; AT 10:215). Later, he entitled his first published work “Discourse on the method of rightly conducting reason and reaching the truth in the sciences” (1:111; AT 6:1). The “masking” that Descartes refers to was, in his view, the distorting encumbrance of the old Aristotelian categories of explanation, which invoked such items as “substantial forms” and “real qualities.” Stones fell to earth, for example, because they possessed the quality of “heaviness” (*gravitas*), this in turn being explained as a defining property possessed by things which had the form or essence of terrestrial matter. Yet such an apparatus, Descartes

complained, was more obscure than the items it was supposed to explain (3:208; AT 2:506). To reach the truth, the sciences had to throw off these masks, and turn instead to the precise quantifiable notions of mathematics, disclosed to each soul by the light of reason. As Descartes puts it in the *Discourse*:

I noticed certain laws which God has so established in nature, and of which he has implanted such notions in our minds, that after adequate reflection we cannot doubt that they are exactly observed in everything which exists or occurs in the world. (1:131; AT 6:41)

Modern readers, however, may be inclined to step back at this point and ask if the theistic note here is really necessary. In replacing the vague qualitative notions of medieval science with laws expressible in quantitative terms, Descartes (together with his illustrious contemporary, Galileo) might, to be sure, have taken a great leap forward: but does this seventeenth-century shift in our understanding of how to describe and predict the physical world really have any connection with the Cartesian metaphysical claims about God?

To answer this question, we need perhaps to recover a sense of just how revolutionary was the new scientific method of the seventeenth century – a sense that has perhaps been lost by familiarity. That the great book of the universe should, as Galileo put it, be written in the language of mathematics, is on any showing a remarkable fact – one that we perhaps have still not fully assimilated. The universe appears to operate in accordance with precise mathematical equations – equations which enable us, when we plug in the appropriate values for the relevant variables, to deliver predictions of extraordinary accuracy. (This is true, by the way, even of the mathematics of modern quantum physics, which, despite its “indeterminacy principle” at the individual micro level, yields amazingly accurate predictive and explanatory results at the macro level.) Descartes’s own formulations (in his work on physics) may have been flawed, but with the achievements of his successors, Newton and then Einstein, and on down to the present, we appear to be getting closer: our mathematical intuitions, intricately elaborated and fed into hypotheses that can be checked against careful observation, do indeed appear to be capable of mirroring the workings of nature. Descartes’s picture of all this – that our finite human minds, though limited in scope, are in principle capable of reflecting the mathematical and logical structures laid down by our creator in the workings of the universe – may admittedly not be the only possible picture of our relationship to the cosmos, but it is one whose coherence and power certainly cannot be dismissed out of hand.

To grasp this point further, it is important to see that the role of God in Descartes’s system is not simply that of a mysterious “prime mover” or “first cause” of the kind envisaged by Aristotle, and subsequently developed in the first two of the five “ways” or proofs of God offered by Thomas Aquinas. Certainly, that is part of the story: God is described in Descartes’s *Principles* as “the primary cause of motion” insofar as “in the beginning he created matter, along with its motion and rest” (Part II, article 36, 1:240; AT 8:61). But the Cartesian universe is a corpuscular universe operating strictly in accordance with certain mathematically expressed laws – the law of conservation of motion, the law of rectilinear motion, and the law of impact – and the results of these

laws are worked out in terms of seven rules for calculating the speed and direction of motion of bodies following impact (articles 37–52). What God does, in Descartes's cosmology, is, as it were, to write the equations governing the behavior of all the particles out of which the cosmos is composed – to determine the values of the mathematical constants which give our world its rhythm and shape and order. Moreover, because God's action is immutable, and he “always operates in a manner that is utterly constant and changeless” (article 36), the universe is perpetually held in being and conserved without any change in the overarching laws. The Cartesian God is thus far from the caricature that his contemporary Blaise Pascal accused Descartes of leaving us with – that of the initial mover who “flicks” the universe into motion and then leaves it to its own devices (*Pensées* (1660) in Pascal 1962: 1001); rather, God is the sole perpetual dynamic force in a cosmos that would otherwise, being simply “extended matter,” be as devoid of activity as a mere set of geometrical shapes.

Divine power and intelligence thus emerges, in Descartes's system, as the true source of all reality – both of everything there is, and of all human knowledge of everything there is. This creative power and intelligence brings the universe into being out of nothing; it decrees the laws of logic and mathematics governing the universe by no less free an act of will than that by which the universe itself is created (3:25; AT 1:152); and it implants in the finite minds of its creatures a limited but in principle perfectly accurate grasp of those laws (2:42–3; AT 7:61–2). The resounding peroration where Descartes concludes his exposition of these matters in the *Meditations* is thus no vaguely pious afterthought, but an essential expression of the absolute centrality of God for his entire metaphysical and physical system of philosophy:

I thus see plainly that the certainty and truth of all knowledge depends uniquely on my awareness of the true God, to such an extent that I was incapable of perfect knowledge about anything else until I became aware of him. And now it is possible for me to achieve full and certain knowledge of countless matters, both concerning God himself and other things whose nature is intellectual and also concerning the whole of that corporeal nature which is the subject-matter of pure mathematics. (2:49; AT 7:71)

The Ethical Dimension

From what has so far been said, it might seem that the divine role is chiefly invoked by Descartes as a necessary structural support for his scientific system. That is true enough, provided we construe the label “scientific” in a very broad sense – much broader than is now found in current English usage. Nowadays, even if the distinction between “facts” and “values” has recently come under increasing philosophical scrutiny, we nevertheless tend to think of science as concerned with the description and explanation of the natural world, while ethical questions about how we should live, or about the nature of goodness and justice, are taken to fall within a quite distinct area of human inquiry. For Descartes, things were very different. He would not have described himself as a “scientist” (that notion had not yet been invented in the seventeenth century), but rather as a philosopher. But a “philosopher” meant not (as it now so often does) someone working on a specialized theoretical topic within a tightly defined academic subject, but rather

someone engaged in developing a systematic and comprehensive understanding of the whole of reality, including both "natural philosophy" (more or less what we now call "science") and also moral philosophy. One of the popular textbooks published when Descartes was a schoolboy was the *Compendium of Philosophy in Four Parts* (the parts being Logic, Ethics, Physics, and Metaphysics), which had proclaimed that "the goal of a complete philosophical system is human happiness" (*Summa philosophiae* (1619), in Eustachius 1998). Descartes's plans for his own system were no less ambitious, and indeed he used a famous organic metaphor to emphasize the unified nature of his thought:

The whole of philosophy is like a tree. The roots are metaphysics, the trunk is physics, and the branches emerging from the trunk are all the other sciences, which may be reduced to three principal ones, namely medicine, mechanics and morals. By 'morals' I understand the highest and most perfect moral system which presupposes a complete knowledge of the other sciences, and is the ultimate level of wisdom. (1:186; AT 9B:14)

Morals could emerge as one of the most important branches of the philosophical system because of the theistic metaphysics in which the system was rooted. The God who is for Descartes the source of the physical creation is also the source of goodness; and the "light of reason" enabling humans to intuit the mathematical structures underlying the universe also allows us to perceive the good. This again may seem somewhat strange to the modern reader, since we tend to think of goodness and truth as quite distinct domains; but Descartes is more than a little influenced by the Platonic model according to which the good and the true are aspects of a single underlying reality. In the Fourth Meditation, we are told that when the mind focuses on an object with perfect clarity, the assent of the will automatically follows: that is, when you see that there is a clear reason for the truth of some proposition (for example, that two plus two makes four), what happens is not simply a passive intellectual perception, but a spontaneous judgment of assent – "Yes: it's true!" But in precisely the same way, according to Descartes's model, when you clearly focus on some action and see there is a clear reason why it is good, then again, you automatically and spontaneously judge – "Yes: it should be done!" The will is the faculty of affirming or denying a truth, and of pursuing a good (or avoiding its opposite). As Descartes puts it: "The more I incline in one direction . . . because I clearly understand that reasons of truth and goodness point that way . . . the freer is my choice" (2:40; AT 7:57–8).

The flavor of the passage, with its overtones of something like religious submission (compare 2:36; AT 7:52), is significant, because we tend to think of the "modern age" that Descartes inaugurated as championing the independent, critical, and autonomous power of humanity to determine the truth for itself. Descartes was certainly a critical thinker, resistant to relying on the authority of established wisdom, and insisting that each of us should follow for themselves the disciplines of reflective inquiry (see *Discourse*, part 1, 1:111ff.; AT 6:1ff.). But the destination of the journey is for Descartes not some supposedly quite independent and wholly self-determining state, but rather an awareness of the divine light which, once perceived, leaves us no choice but to assent. Just as the ancient prayer had affirmed that "to serve God is perfect freedom," so Descartes's model of the free human intellect is of an intellect that is so gripped by the clarity of the

divinely ordained truth and goodness it perceives that no other option is possible than to align oneself towards it.

This harmonious, theistically inspired vision may appear starkly at odds with the ordinary realities of human struggle, error, and failure; but Descartes is in fact acutely aware of the weakness of our nature, and spends a great deal of effort endeavoring to explain it in a manner consistent with his belief in a divine creator who is the source of goodness and truth. Theologians for many centuries prior to Descartes had wrestled (as they have subsequently continued to do) with the so-called “problem of evil” – the existence of so much wrongdoing and suffering in a world supposedly produced by a surpassingly good creator; and St. Augustine in the fourth century had offered what we now call a “theodicy” (a vindication of God’s justice) that laid great emphasis on the faulty human use of our free will. Descartes, strongly influenced by Augustine (cf. Menn 1998), takes a very similar line in his own theodicy in the Fourth Meditation. If our minds are illuminated by the divine light, how come we make false judgments, or choose the bad, or a lesser good, when the greater good is staring us in the face? Descartes, as we have seen, maintains that while we focus on the truths disclosed by the light we cannot but assent; but because our intellects are *finite in scope*, there are many truths we do not clearly perceive. In such cases, we ought to withhold our assent, but instead we often rashly jump in and make a judgment – and “in this incorrect use of free will” is to be found “the essence of error” (2:41; AT 7:60).

On the purely theoretical plane, this recipe for the avoidance of error (“Withhold judgment when the truth is not clear”) may have much to commend it; but on the level of practical morality, Descartes has to admit that we do not always have the luxury of such aloof abstention from commitment (1:122; AT 6:22). Choices often have to be made even when the evidence is not conclusive; people need to eat, without waiting for a full chemical analysis of the bread in front of them. The problem is compounded by the fact that much of our ordinary human life is not concerned with abstract intellectual judgment, but is inextricably bound up with bodily sensations, and more complex emotions – a whole range of affective states from hunger and thirst and pleasure and pain, to hope, fear, anger, love, joy, sadness, and so on. The belief in a benevolent creator faces a direct challenge here, which Descartes must confront, for several reasons.

In the first place, our sensory states do not always seem to be reliable indicators of what is good for us: “Those who are ill may desire food or drink that will shortly afterwards turn out to be bad for them” (2:58; AT 7:84). Descartes (in a further phase of his project of theodicy, this time in the Sixth Meditation) replies that the mind-body complex is designed by God to work in accordance with fixed principles: certain physiological states (e.g., a shortage of fluid in the body) will produce certain psychological signals (e.g., a feeling of dryness in the throat). And although there may be some conditions, like dropsy, where drinking when thirsty is not advisable, nevertheless “the best system that could be devised is that [a given state of the nervous system and the brain] should produce the one sensation which, of all possible sensations, is most especially and most frequently conducive to the preservation of the healthy human being” (2:60; AT 7:87).

This picture of a divinely crafted system of mind-body correlations that generally works for our survival and welfare as human beings is threatened, however, by a

further problem: that of the complex set of emotional states and dispositions that were known in Descartes's time as "the passions." Often – and this is an age-old issue in moral philosophy – feelings of anger, or arousal, or fear or enthusiasm may lead us astray, making some good appear more important, or some evil more threatening, than it really is. The passions, as Descartes at one point puts it, often "represent the goods to which they tend with greater splendour than they deserve, and they make us imagine pleasures to be much greater before we possess them than our subsequent experiences show them to be." The result, all too familiar, is that giving rein to our passions can frequently lead to "dissatisfaction, regret and remorse" (3:264; AT 4:285).

Descartes's theocentric ethics, however, offers a way out. He maintained, as we have seen, that human beings are equipped, via the "light of reason" with clear and distinct perceptions of the good, and that contemplating the good leaves us no choice but to wish to pursue it. Human concentration, however, is weak and limited, and we cannot always be focusing on the clear deliverances of the light of reason. Moreover, as embodied creatures we also have emotional responses, which, though generally conducive to our welfare (fear makes us flee from danger, anger helps us defend ourselves, attraction leads us to seek out friends and partners), can nevertheless sometimes lead us astray. But the solution to this, according to Descartes, lies in drawing on the results of Cartesian science: our scientific knowledge of the workings of the passions, and the way they are linked to physiological mechanisms, will enable us to manage and control them, so that they can be brought into line with what our reason perceives to be good, and thus become a source of joy (3:264; AT 4:285).

The working out of this Cartesian moral theory, though quite subtle and complex in its ethical, psychological, and physiological detail (Cottingham 1998b), leaves us in the end with a picture of the good life that is remarkably positive. There is a strong sense of a benevolent presence at the roots of our humanity. So far from being the product of "fate or chance or a continuous chain of events" (2:14; AT 7:21), our human nature bears the stamp of its creator. Our intellect or "light of reason" is directly God-given; and as for the sensory and emotional apparatus that derives in part from our embodied nature, once we learn to understand and control its workings, we shall see that there is "absolutely nothing to be found there that does not bear witness to the power and goodness of God" (2:60; AT 7:87).

Conclusion

In bringing this survey of the role of God in Cartesian philosophy to a close, it may be helpful to observe that what might be called the "religious" flavor of much of Descartes's thinking should not be confused with the very different, faith-based, religious approach to philosophizing that is found, for example, in his contemporary Pascal, and, in a more extreme form, in much later thinkers such as Søren Kierkegaard. Descartes does acknowledge, in addition to the natural light of reason, a "supernatural light" of faith (2:106; AT 7:148), but it turns out that the concept of faith does not play any significant role in his philosophical system. God is central, but it is a God who is established by reason, and who underpins the rationality of a system of science and morality that offers genuine power to human beings to ameliorate their lives (1:142; AT 6:62). The

darker struggles of the soul – the lonely existentialist thinker, abandoning the comforts of assured systems of philosophy and struggling to maintain a willed act of faith, “out on the deep, over seventy thousand fathoms of water” (Kierkegaard 1846) – are light years away from the Cartesian worldview.

Descartes, whom it remains quite appropriate to call one of the inaugurators of modern science, has a measure of that optimism about our human nature, and our future, that is displayed by some of the breezier modern advocates of science-plus-technology as the key to improving our lot. But, for Descartes, unlike many present-day enthusiasts for science, this optimism is rooted in a cosmology that provides it with a secure anchor point. Given the assurance of a rationally ordered universe, and a supremely benevolent creator, we can be sure we have the means at our disposal to achieve knowledge of the true and the good, and to regulate our lives in a way that allows us to be oriented towards that truth and goodness. The vision may not be as “modern” as might be expected from a thinker who is often called the father of modernity; but it remains, for all that, an inspiring vision of what a philosophical system, grounded in religious belief, can aspire to articulate.

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Chapter 18

The Cartesian Circle and the Foundations of Knowledge

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In the first two sentences of the *Meditations*, Descartes writes that having been

struck by the large number of falsehoods that I had accepted as true in my childhood, and by the highly doubtful nature of the whole edifice that I had subsequently based on them[,] I realized that it was necessary, once in the course of my life, to demolish everything completely and start again right from the foundations if I wanted to establish anything at all in the sciences that was stable and likely to last. (2:12; AT 7:17)

What are these foundations of knowledge? Well, according to Descartes, everything that I clearly perceive is true. Sometimes this is called the “truth rule.” (What he often says is that everything I clearly and distinctly perceive is true. But he also thinks that everything I clearly perceive is true, and it will simplify matters to lay aside complications introduced by distinct perception.) The truth rule represents a fact about my nature: I have been so constructed by God that everything I clearly perceive is true. So establishing the truth rule involves a certain amount of quite substantive metaphysics about me, my place in the universe, and the universe itself. I shall refer to this constellation of views – the truth rule, my nature, its origin in God – as the “metaphysical underpinnings” of cognition.

Immediate questions arise about the coherence of Descartes’s foundational enterprise. It is natural to think that knowing the foundations of knowledge should somehow bolster or reinforce all of human knowledge, so that until we know the foundations we cannot know anything else, at least not in the fullest sense of knowing. Descartes seems to hold something along these lines. He writes near the end of the Fifth Meditation, “Thus I see plainly that the certainty and truth of all knowledge [*omnis scientia certitudinem & veritatem*] depends uniquely on my awareness of [*cognitione*] the true God, to such an extent that I was incapable of perfect knowledge [*perfecte scire*] about anything else until I became aware of [*nossem*] him” (2:49; AT 7:71; as translated in CSM’s more recent student editions). And this raises problems.

First, as Arnauld points out, if I can know anything only *through* knowing the foundations of knowledge, it is unclear how I come to know the foundations of knowledge themselves:

I have one further worry, namely how the author avoids reasoning in a circle when he says that we are sure that what we clearly and distinctly perceive is true only because God exists.

But we can be sure that God exists only because we clearly and distinctly perceive this. Hence, before we can be sure that God exists, we ought to be able to be sure that whatever we perceive clearly and evidently is true. (2:150; AT 7:214)

Arnauld takes Descartes to maintain that my certainty of God's existence rests on my certainty of the truth rule (thus: "before we can be sure that God exists, we ought to be able to be sure that whatever we perceive clearly and evidently is true"); in other words, that we know that God exists through knowing the metaphysical underpinnings of cognition. But since knowing the metaphysical underpinnings of cognition requires knowing that God exists, it looks as if we are caught in a circle.

Second, as the authors of the Second Objections point out, it seems false to claim that I cannot know anything *before* I know the foundations of knowledge. In the *Meditations* themselves, doesn't the meditator discover her own existence before she learns that God exists? For that matter, can't someone know geometry without ever learning that her creator made her such that her clear perception is always true?

These objections constitute at least one version of what is called the Cartesian Circle. I take the basic problem here to be, can we make sense of the idea that knowing the metaphysical underpinnings of cognition somehow bolsters or reinforces all of human knowledge without courting the unwelcome consequence that we know everything *through* knowing the foundations (Arnauld) or that we can know nothing *until* we know the foundations (the Second Objectors). There is a second version of the Circle, having specifically to do with whether Descartes can answer skeptical doubt (particularly the challenge posed by the so-called "evil genius" doubt) in a non-question-begging way. I will briefly take that up at the end of this chapter. For most of the chapter, however, I want to focus on the version of the Circle that worried Descartes's contemporaries, namely the relation between knowing and knowing the metaphysical underpinnings of cognition.

It seems clear to me that Descartes thought carefully about this relation and that he has philosophically interesting things to say about it. But the territory was new – since the idea that philosophy should begin by laying the foundations of knowledge was new – and it requires a certain amount of patience with his text to follow his thought on the matter. One thing that turns out to be very important but very easy to miss is that Descartes is not working with a single, uniform mode of cognition (or "knowledge"), but actually with two rather different modes of cognition (or "knowledge"): clear perception and *scientia*. By paying careful attention to each of them, especially to what each is supposed to provide and how, we will, I believe, be able to make progress with understanding Descartes's thinking about this topic.

Clear Perception and Seeing That Something Is So

I want to begin by taking up Descartes's notion of clear perception. It seems to me that certain pictures of the relation between clear perception and the truth rule seriously

underestimate what clear and distinct perception accomplishes on its own, before one has learned why the truth rule holds.

Although Descartes does not use the word “clear” there, the meditator’s first taste of clear perception comes in the *cogito* passage. There, from deep within methodological doubt, the meditator is brought to see that something is the case:

Yet apart from everything I have just listed, how do I know that there is not something else which does not allow even the slightest occasion for doubt? Is there not a God, or whatever I may call him, who puts into me the thoughts I am now having? But why do I think this, since I myself may perhaps be the author of these thoughts? In that case am not I, at least, something? But I have just said that I have no senses and no body. This is the sticking point: what follows from this? Am I not so bound up with a body and with senses that I cannot exist without them? But I have convinced myself that there is absolutely nothing in the world, no sky, no earth, no minds, no bodies. Does it now follow that I too do not exist? No: if I convinced myself of something then I certainly existed. But there is a deceiver of supreme power and cunning who is deliberately and constantly deceiving me. In that case too I undoubtedly exist, if he is deceiving me; and let him deceive me as much as he can, he will never bring it about that I am nothing so long as I think that I am something. So after considering everything very thoroughly, I must finally conclude [*denique statuendum sit*] that this proposition, *I am, I exist*, is necessarily true [*necessario est verum*] whenever it is put forward by me or conceived in my mind. (2:16–17; AT 7:24–5)

What Descartes is trying to bring about through the series of considerations presented in the early part of the passage is the experience of seeing that something must be so, the experience of grasping the truth. Consider the concluding sentence of the passage: “I must finally conclude [*denique statuendum sit*] that this proposition, *I am, I exist*, is necessarily true [*necessario est verum*].” The implicit “must” in *statuendum sit* (literally: it is to be held) and the *necessario* are meant to capture experience of seeing that something has to be the case (as in “Aha! – so the butler must have done it!”); and the *verum* makes explicit that the meditator’s seeing that something is so is a matter of her getting on to the truth. This experience of seeing that something must be so is surely very remarkable to the meditator, who only a moment ago, in thrall to skeptical doubt, worried aloud that there might be practically no truth (“So what remains true? Perhaps just the one fact that nothing is certain”). It is a moment in which she recognizes that – the skeptical doubt notwithstanding – she has the ability to see that at least *some* things are true, for example, that she exists.

Let me say a little more about the experience of “seeing that something must be so” that Descartes is trying to produce in the meditator. This is what happens when, as Descartes will put it in the Third Meditation (¶9), something’s “truth has been revealed to me by some natural light.” Although having the truth revealed to you by natural light sounds rather mysterious, I think the experience that Descartes has in mind is quite ordinary and familiar (which is not to deny that Descartes finds it remarkable and easy to overlook). It’s what happens when you notice that, as you’re thinking or as you engage in skeptical argument, you must exist. But it’s also what happens when you realize that the longest side of a triangle subtends its greatest angle. Descartes also tells us in III.¶9 that when something has been revealed to you by the light of nature it

“cannot in any way be open to doubt.” I take this to be familiar as well. As I work through the *cogito* reflection, I am unable to doubt that I exist; or, again when I consider a triangle, I am unable not to judge that the longest side subtends the greatest angle. It is not simply, of course, that I find myself unable to doubt, as if under the influence of a posthypnotic suggestion. There’s a reason I cannot doubt; namely, I see that (under the circumstances) it *must* be the case that I exist, or that the three angles of a triangle sum to two right angles. (I should say I do not see an important distinction for Descartes between something’s being revealed to me by the light of nature and my perceiving clearly that thing’s being the case.) In III.¶9, Descartes contrasts having a truth revealed to you by natural light with being led to believe something by what he calls “spontaneous impulse.” According to him, we are initially led to almost all of our beliefs about body and our physical welfare through such impulses and propensities. For example, when I am thirsty, I just “find myself” inclined to believe that drink would be good for me. In this case, my inclination to believe is not determined by any clear perception that drink would be good for me.

Now, we don’t as of yet have a very clear view of how this seeing that something is so interacts with the evil genius doubt. We will examine this interaction in the next section, when we look at the beginning of the Third Meditation. But I believe that even the little that we have seen so far makes it unlikely that Descartes holds a view that has been often attributed to him, an attribution that, in my opinion, has greatly obscured our understanding of how he sees human knowledge. This is the view that until I know the truth rule (and so until I know the metaphysical underpinnings of my cognition or until I am able to refute the evil genius doubt), perceiving clearly affords me only what is sometimes termed “psychological certainty.” Let me explain.

To my knowledge, “psychological certainty” in the context of Descartes exegesis first appears in Alan Gewirth’s (then spelled “Gewirtz”) influential, classic 1941 article, “The Cartesian Circle.” For Gewirth, psychological certainty is the state of a compulsory belief that you find yourself in when you clearly perceive something but haven’t refuted the evil genius. In that article, he characterizes psychological certainty as the sort of certainty you have when “the mind is compelled to assent to the truth of directly presented clear and distinct perceptions, but in which metaphysical doubt is still possible” (p. 386). But I find it hard to understand this as *certainty*. If metaphysical doubt is still open to the meditator, then there’s a doubt that she can take up (and perhaps should take up). If for whatever reason she is at the moment unable to take it up, I would think it more accurate to describe her condition as “almost” certain or “all-but-certain.”

More important, it is hard to understand how the compulsion to assent is supposed to work in such a situation. On the one hand, as many commentators, including Gewirth, agree, the compulsion in clear and distinct perception is supposed to be rational; on the other hand, the meditator’s inability to take up a pertinent doubt while clearly perceiving makes it seem as if clearly perceiving produces a temporary blind spot in her, as if the sheen from her clear perception makes her insensible to considerations whose relevance she would recognize under other conditions.

I don’t think this can be right. It seems at odds with how Descartes structures the *cogito* experience. I am not all-but-certain that I exist; I’m certain that I exist (here I am in broad agreement with Broughton 2002: 184–5). When I am working through the *cogito*, it is not that I am somehow failing to acknowledge a skeptical consideration

(the evil genius) that in another mood would impress me (and should impress me); rather, the doubt does not faze me because I can *see* that I exist or, as Descartes puts it, “I must finally conclude [*denique statuendum sit*] that this proposition, *I am, I exist*, is necessarily true [*necessario est verum*] whenever it is put forward by me or conceived in my mind.” It may be that the *cogito* is special in the *specific way* that it is immune to the evil genius doubt, for my existence is directly implicated in the doubt itself (viz. that *I* have been created by an evil genius, or that an evil genius is deceiving *me*; see Broughton 2002: chs. 6 and 7). However, I think Descartes’s position is that *any* clear perception is immune to doubt. As a textual matter, Descartes holds that it is impossible to doubt any clear perception while entertaining it. And, again, it does not make sense to view this inability as a sort of defect, as if my clear perception made me oblivious to a pertinent skeptical consideration, rendering me psychologically incapable of taking it up. Rather, the reason why I, in my current condition, (rightly) find the skeptical consideration impotent is that my current perception makes clear to me that something is so. Thus, for example, if I am perceiving clearly why the three angles of a triangle must sum to two right angles – working through my perception, noting various relationships, and so forth – Descartes’s view is not simply that I *cannot* withhold my assent on the basis of the evil genius doubt, it is also that I *should* not withhold my assent.

So, even if there are interesting philosophical differences between the relation of the *cogito* to the evil genius doubt, on the one hand, and the relation of clearly perceived mathematics to the doubt, on the other, these differences do not show up, I think, in a difference in their general immunity to the doubt. Thus, in the passage where, it seems to me, Descartes is most explicitly concerned to position clear perception vis-à-vis the evil genius doubt, namely, the fourth paragraph of the Third Meditation, he treats “something very simple and straightforward in arithmetic and geometry” as on an even footing with the *cogito* (“let whoever can do so deceive me, he will never bring it about that I am nothing”) (2:25; AT 7:35–6).

Clear Perception and the Truth Rule

If we understand clear perception along the lines I’ve just suggested, so that someone who clearly perceives the truth is aware of her judgment’s being determined by the truth, then it might seem that there is no need to establish the truth rule or to respond to the evil genius doubt: someone who is perceiving clearly seems to be getting along perfectly fine without doing either.

To get a better picture of the point of knowing the truth rule and the interplay between clear and distinct perception and the evil genius doubt, we should begin by carefully considering Descartes’s introduction of the truth rule. This comes near the beginning of the Third Meditation:

I am certain that I am a thinking thing. Do I not therefore also know what is required for my being certain about anything? In this first item of knowledge [*cognitione*] there is simply a clear and distinct perception of what I am asserting; this would not be enough to make me certain of the truth of the matter [*certum de rei veritate*] if it could ever turn out that

something which I perceived with such clarity and distinctness was false. So I now seem to be able to lay it down as a general rule that whatever I perceive very clearly and distinctly is true. (2:24; AT 7:35).

Descartes introduces the rule as the product of reflection on what went well in the Second Meditation's exploration of the mind's existence and nature. Two things would seem to follow. First, the truth rule is a higher-order thesis, that is, a thesis about the nature of our cognition: it involves taking up a reflective position on our cognition. Second, the procedure Descartes follows here makes the best sense if, during the *cogito* experience itself, the meditator is really certain and not simply all-but-certain. That is, it makes the best sense if we view the meditator as saying to herself, "I recall being certain that I was getting on to the truth. That cognition was marked by special clarity and distinctness. Perhaps everything I clearly and distinctly perceive is true." In contrast, the flow of thought seems rather awkward if the meditator takes herself to be only all-but-certain: "I recall being psychologically compelled to believe that I exist on the basis of internal rational considerations that were so convincing that they made it impossible for me to doubt this, even if there remains, I must admit, an outstanding worry about the evil genius. That cognition was marked by special clarity and distinctness. Perhaps everything I clearly and distinctly perceive is true." "True"? Wouldn't the natural outcome of this chain of reflection be "I'm ready to hypothesize that everything I clearly and distinctly perceive is in such internal rational order that it is assent-compelling"?

One might object, in terms of the text itself, that what Descartes emphasizes is certainty: "I am *certain* that I am a thinking thing. Do I not therefore also know what is required for my being *certain* of anything?" (my emphasis). And surely being certain of something is compatible with being wrong, as in "But I was certain that he had weapons of mass destruction." I don't know that the English word "certain" generally works this way, but in any case Descartes is plainly assuming here that I cannot be certain of something false, for he immediately goes on to remark that clear and distinct perception "would not be enough to make me certain of the truth of the matter [*certum de rei veritate*] if it could ever turn out that something which I perceived with such clarity and distinctness was false." As Descartes uses the term, certainty brings with it truth. (This will be important for a proper understanding of some of his remarks early in the Fifth Meditation.)

The truth rule is introduced, then, as a higher-order hypothesis about the nature of my cognition, arrived at by my reflecting on what seems to allow me, when I am in a *cogito*-like state, to get on to the truth. In the next paragraph he begins to assess the prospects of this hypothesis. Although there he "accepted [*admisi*] as wholly certain and evident" things that really weren't – consonant with the connection between certainty and truth just noted, I take "*accepting* as certain" (my emphasis) to be different from actually *being* certain, so that you can accept as certain things that are not really certain – these were things that "I thought I perceived clearly, although I did not in fact do so" (2:24–5; AT 7:35). (It is worth noting, if only to counter certain popular views about Descartes's position on the "transparency" of thought, that Descartes quite openly allows that one might, through carelessness or inattention, think that one has clearly perceived when one hasn't, or take oneself to have been in a *cogito*-like state

when one wasn't.) So the hypothesis that everything I clearly and distinctly perceive is true is at least consistent with my past experience.

Now, although the hypothesis is plausible and appears to be consistent with past experience, this hardly counts as seeing that it is true. Descartes brings this out by adverting to the evil genius doubt, in the fourth paragraph of Meditation Three. This is a remarkable paragraph where he brings the evil genius doubt face to face with clear and distinct perception. It is important for understanding how Descartes sees the relation between perceiving clearly and knowing the foundations of knowledge.

The paragraph begins:

But what about when I was considering something very simple and straightforward in arithmetic or geometry, for example that two and three added together make five, and so on? Did I not see at least these things clearly enough to affirm their truth? Indeed, the only reason that I afterwards judged [*postea judicavi*] that they were open to doubt was that it occurred to me that perhaps some God could have given me a nature such that I was deceived even in matters which seemed most evident. And whenever my preconceived belief [*praeconcepta*] in the supreme power of God comes to mind, I cannot but admit that it would be easy for him, if he so desired, to bring it about that I go wrong even in those matters which I think [*puto*: deem, believe] I see utterly clearly with my mind's eye. (2:25; AT 7:35–6)

In the first two sentences the meditator seems tempted to affirm the truth rule on the basis of her experience with very simple subject matters. It seems obvious to her in such situations that it is the clarity of her perception that is getting her on to the truth; it may even seem obvious to her that it is in the nature of perceiving clearly always to have this result. But, then again, stepping back and sizing up her cognitive situation, she has to allow that for all she knows, "perhaps some God could have given me a nature such that I was deceived even in matters which seemed most evident." The issue that is being raised here, I think, is really one about the absence of knowledge on her part; she does not know enough about her nature to say why what seems to be the case – that everything she clearly perceives is true – should in fact be the case. While her *cogito*-like experiences are suggestive in this direction, they hardly show her that this must be the case.

Notice that Descartes describes the doubtfulness of what is clearly perceived as a judgment that she makes "afterwards" (*postea*). One might think that his point is that raising this question about her nature is something that simply did not occur to the meditator earlier. I think there's another reason for the *postea*: when I am clearly and distinctly perceiving something, the truth is present to me and I know that it is; there is no room for doubt. Doubt becomes possible only afterwards, when I stop clearly perceiving that something is so. Descartes carefully develops this point in the remainder of the paragraph, by having the meditator move into and out of a *cogito*-like state. While in such a state – while she is focused on the "things themselves" – it is obvious to her that she is getting on to the truth:

Yet when I turn to the things themselves [*ipsas res*] which I think [*arbitror*: I judge] I perceive very clearly, I am so convinced by them that I spontaneously declare [*sponte erumpam*]: let whoever can do so deceive me, he will never bring it about that I am nothing, so long

as I continue to think I am something; or make it true at some future time that I have never existed, since it is now true that I exist; or bring it about that two and three added together are more or less than five, or anything of this kind in which I see a manifest contradiction. (2:25; AT 7:36)

But after she exits this *cogito*-like state, she returns to the higher-order question about the author of her nature broached earlier in the paragraph:

And since I have no cause to think that there is a deceiving God, and I do not yet even know for sure whether there is a God at all, any reason for doubt which depends simply on this supposition is a very slight and, so to speak, metaphysical one. But in order to remove even this slight reason for doubt, as soon as the opportunity arises I must examine whether there is a God, and, if there is, whether he can be a deceiver. For if I do not know this, it seems that I can never be fully certain [*plane certus*] about anything else. (2:25; AT 7:36)

We should pay attention to the “fully [*plane*]” in the “fully certain” in the last line: until I know the metaphysical underpinnings of cognition, I cannot be fully certain. Yet, earlier in the meditation, it was suggested that when I am in a *cogito*-like state, I am certain, where that goes beyond mere rational conviction, reaching all the way to the truth. Evidently, there are two sorts of certainty, both involving truth, plain vanilla certainty and full certainty. This is confirmed, as we shall see, by the Fifth Meditation, where Descartes implies that there are different “grades [*gradus*]” of certainty. Of course, how there can be more than one grade of certainty isn’t obvious; Descartes does not really explain this until the end of the Fifth Meditation.

Descartes’s putting us into a *cogito*-like state and pulling us back out again is masterly. There is (and, I think, there is supposed to be) something unsettling about this now-you-see-it/now-you-don’t experience. When I’m in the *cogito*-like state, it is plain to me that I am on to the truth. When I exit a *cogito*-like state, I am no longer seeing that something is so. If I experience a tendency to continue to give my assent to what I had just clearly perceived in the absence of clearly seeing that something is so, it would seem that this tendency is simply a sort of cognitive inertia brought on by the afterglow of the previous perception. I would have more than simply the afterglow to work with, however, if I saw why it should be the case that when I am in a *cogito*-like state I always get on to the truth. For, understanding this, coupled with the fact that I had been in a *cogito*-like state, would give me, in effect, another way of seeing what I had previously perceived is true. But absent such an understanding, I can now begin at least to wonder about – Descartes says doubt – the efficacy of the *cogito*-like state I was in just a moment ago: Was I really seeing the truth then or did it only seem to me that I was seeing the truth?

Now, I don’t deny that one might have qualms about how Descartes thinks about the difference between being in a *cogito*-like experience and being out of it. For one thing, there are obviously delicate issues about the temporal boundaries of a *cogito*-like experience and the role of memory both within it and between it and subsequent cognition. For another thing, there are issues about the meditator’s cognitive unity or integrity: if one has sufficient distance on one’s past *cogito* experience, it may not be difficult for one to adopt a higher-order perspective on it and treat it, as I believe

Descartes is in effect doing, in a “third person” sort of way. It is harder to do this, however, while the experience is fresh in one’s mind; it seems to induce a sort of episodic schizophrenia. From one instant to the next, depending on whether she directs her attention to the “things themselves” or to God and the origin of her nature, the meditator finds herself either in a condition of being certain of at least some things (where this involves, I think, being on to the truth and knowing that one is on to the truth) or of doubting whether even her best perception gets her to the truth.

One of the things that may encourage Descartes in his way of thinking about the difference between being a *cogito*-like experience and remembering having been in a *cogito*-like experience, is that, once knowledge of the metaphysical underpinnings of cognition is in place, the difference becomes practically unimportant. Be that as it may, we might well agree with him that there is an important philosophical distinction to be drawn in the vicinity between one’s first-order cognition and one’s second-order reflection on one’s nature as a knower, however exactly the details are worked out. And we might well agree, further, that doubts that arise at the second-order, reflective level about my being the sort of cognizer who gets on to the truth can have (let me be vague) a destabilizing effect on one’s confidence in the deliverances of one’s first-order cognition.

Let’s turn to the Fifth Meditation. It is at the end of this meditation that Descartes details the relationship between certainty and full certainty, between what’s available to us before we know the metaphysical underpinnings of our cognition and what’s available only after we have discovered them. But, relatively early in this meditation, Descartes makes a pair of interesting remarks that seem to me to foreshadow the discussion that is to come at the end of the meditation. Let’s begin with them.

At the end of the sixth paragraph, he writes:

And even if I had not demonstrated this [namely, I have already amply demonstrated all those things that I clearly cognize are true (*demonstravi illa omnia quae clare cognosco esse vera*)], the nature of my mind is such that I cannot but assent to these things, at least so long as I clearly perceive them. I also remember that even before, when I was completely preoccupied with the objects of the senses, I always held that the most certain truths of all [*pro omnium certissimus habuissem*] were the kind which I recognized clearly in connection with shapes, or numbers, or other items relating to arithmetic and geometry, or in general to pure and abstract mathematics. (2:45; AT 7:65)

I think that if one were to consider only the second half of the first sentence, “the nature of my mind is such that I cannot but assent to these things, at least so long as I clearly perceive them,” one could reasonably think that Descartes’s point is that I am psychologically compelled to assent to certain things (Curley 1978: 163, for example, interprets the remark this way). But such a reading does not, I think, comport well with the rest of the passage, which I read as follows. Descartes has just found the last piece of the metaphysical underpinnings of cognition, namely his doctrine of true and immutable natures (which concern what we are related to when we cognize distinctly, as opposed to only clearly). Now, to ward off misunderstanding, he wants to indicate what we would have going for us even if we did not know the metaphysical foundations of our cognition. Of course, he says, one does not need to know all of this in order to do mathematics, in order to know mathematical truth. (He is, in effect, anticipating an

objection from the authors of the Second Objections to the effect that it follows from Descartes's views that an atheist cannot know geometry.) One would still be certain of getting on to the truth while doing mathematics, which is why Descartes, before taking up his foundational project, regarded mathematical truths to be the "most certain . . . of all." Other readings of the passage may be possible. But if we take Descartes to be working with all-but-certainty here rather than certainty, I think it becomes quite unclear what the *point* of this passage could be: even if one didn't know the metaphysical underpinnings of one's cognition, one's mathematical perception would still be internally in order and rationally compelling. Yes, but so what? What comfort should we take in that?

This general reading of the end of ¶6 is confirmed, I think, by a remark that Descartes makes at the end of ¶7:

Hence, even if it turned out that not everything on which I have meditated in these past days is true, the existence of God ought to hold for me at least the same grade [*gradu*] of certainty as the truths of mathematics have hitherto [*hactenus*] held. (2:45; AT 7:65–6)

Here Descartes says that even if I were mistaken about the metaphysical underpinnings of our cognition ("even if it turned out that not everything on which I have meditated in these past days is true"), I would have certainty about the existence of God – in fact the same grade of certainty that mathematics had previously held for me. As with ¶6, I don't think Descartes is saying here that even if I were wrong about the foundations of my knowledge, I would still have the consolation of being rationally persuaded that God exists, let the truth fall where it may. Rather, I think, as we saw earlier (2:24; AT 7:35), certainty involves *truth* for Descartes. Even if I hadn't discovered the foundations of knowledge, I would still be certain that God exists. To be sure, the phrase "at least the same grade of certainty" implies that there is a higher grade of certainty – I take this higher grade to be the "full certainty" mentioned at the end of the fourth paragraph of the Third Meditation (2:25; AT 7:36) – but we shouldn't take that as an invitation to turn the lower grade of certainty into something less than it is, an almost-certainty or all-but-certainty. The lower grade of certainty is still a species of *certainty*, which, for Descartes, involves seeing that something is true.

But how can there be two grades of certainty? If when I perceive clearly I already grasp the truth (and know that I do so), what more could there possibly be by way of certainty? How is there room for a higher "grade" of certainty, or for some additional "full certainty" as opposed to ordinary certainty?

Let's approach this question by considering Descartes's introduction of the idea of *scientia* in the last four paragraphs of the Fifth Meditation. (Very roughly, having *scientia* is the condition the meditator is in after she has recognized the metaphysical underpinnings of her cognition.) That discussion culminates with a remark that we considered near the beginning of this chapter:

Thus I see plainly that the certainty and truth of all knowledge [*omnis scientia certitudinem & veritatem*] depends uniquely on my awareness [*cognitione*] of the true God, to such an extent that I was incapable of perfect knowledge [*perfecte scire*] about anything else until

I became aware of [*nossem*] him. And now it is possible for me to achieve full and certain knowledge [*plane nota & certa*] of countless matters, both concerning God himself and other things whose nature is intellectual, and also concerning that corporeal nature which is the subject-matter of pure mathematics. (2:49; AT 7:71)

One might take this passage to suggest (as the authors of the Second Objections apparently did) that we cannot know anything until we know the foundations of knowledge, thereby raising the specter of the Cartesian Circle. However, closer inspection of this passage indicates that Descartes has in view two different modes of cognition. There's *scientia* or *perfecte scire*, the condition one has reached after recognizing the foundations of knowledge. And there is the means by which one recognizes those foundations, which is, I take it, simply to perceive them clearly – that is, simply to perceive clearly that the author of my nature is not a deceiver and that this entails that everything I clearly and distinctly perceive is true. (Although Descartes mentions only God here, I take it that this is a kind of shorthand, and that in order to have *scientia* I also need to have perceived clearly the rest of the metaphysical underpinnings of cognition.)

What should we make of these two modes of cognition? One senses that Descartes is being careful with his terminology here, and perhaps struggling with it a bit, as if (perhaps because of the originality of his project of laying the foundations of knowledge) he has ready at hand no off-the-shelf vocabulary that will answer his needs. Let's look briefly at the vocabulary.

Clearly perceiving, by itself, as we have seen, entails only the lower grade of certainty, what we might call plain certainty or certainty *simpliciter*. So cognition that Descartes characterizes as *certus* as opposed to *plane certus* belongs to this mode. I think cognition (*cognitio*), especially clear cognition (see Second Replies, AT 7:141), *noscere* (knowing in the sense of being acquainted with), and *scire*, when it is not qualified by *perfecte*, all belong to this mode of cognition. Also, *ignorare* (i.e., not-*noscere*; to be unacquainted with) marks the absence of this mode of cognition. For the second mode of cognition, Descartes uses the phrases *scientia*, *plane certus*, *perfecte scire*, and *plane nota & certa*. I'll use the Latin *scientia* to mark it. The word was a well-established term of art in the tradition, and I believe that Descartes consciously borrowed the word from the tradition.

According to the tradition, what is *scientia*? *Scientia* was the term used in the Latin tradition to translate the Greek *epistēmē*. *Epistēmē* is knowledge of reasoned fact – that is, the sort of knowledge one has of a thing by seeing why it is true. For Aristotelians, syllogisms were supposed not only to make the conclusion of the syllogism certain, but also to exhibit relevant causes, and so provide an explanation of why the conclusion is true. Many commentators have thought that it is better to translate the Greek word *epistēmē* by the English word “understanding” than by “knowledge,” in order to mark this connection with explanation: to have *epistēmē* (or *scientia*) of something is not just to be certain that it is so, but also to understand why it is so. Now, for Descartes, too, *scientia* or *epistēmē* involves both certainty and explanation, although, as I will suggest, he alters the notion in a fundamental way.

How, according to Descartes, is *scientia* connected with certainty? His basic thought here is that without an understanding of my cognitive faculties and why they lead me

to the truth, I am continually subject to the now-you-see-it/now-you-don't experience presented in the Third Meditation. Here's how he puts the general point:

Admittedly my nature is such that so long as I perceive something very clearly and distinctly I cannot but believe it to be true. But my nature is also such that I cannot fix my mental vision continually on the same thing, so as to keep perceiving it clearly; and often the memory of a previously made judgment may come back, when I am no longer attending to the arguments which led me to make it. And so other arguments can now occur to me which might easily undermine my opinion, if I did not possess knowledge [*ignorarem*] of God; and I should thus never have true and certain knowledge [*scientiam*] about anything, but only shifting and changeable opinions. (2:48; AT 7:69)

In the remainder of the paragraph, he makes this somewhat more concrete by playing an example from geometry off against the worry that he might have a defective nature (only "somewhat more" concrete because he does not actually lead the meditator through a geometrical proof):

For example, when I consider the nature of a triangle, it appears most evident to me, steeped as I am in the principles of geometry, that its three angles are equal to two right angles; and so long as I attend to the demonstration, I cannot but believe this to be true. (2:48; AT 7:69–70)

We are asked to imagine someone attending to a demonstration, which, I take it, puts someone in what I have been calling a *cogito*-like state. Here it helps to remember that Descartes thinks of a demonstration as a set of cues for helping one to see that something is or must be so, rather than as an abstract object relating premises and conclusions according to truth-preserving rules. Now, if she could remain in such a condition her entire life – that is, if she continually "saw through" the subject matters she thinks about in the way that someone attending fully to a mathematical argument does – then there would be no room for "fuller" certainty; she would have as much certainty as possible. However, no one can continually remain in such a condition, where her judgment is constantly determined by clear perception; and when she exits the *cogito*-like condition there is room for doubt:

But as soon as I turn my mind's eye away from the demonstration, then in spite of still remembering that I perceived it very clearly, I can easily fall into doubt about its truth, if I am without knowledge of God [*Deum ignorarem*]. For I can convince myself that I have a natural disposition to go wrong from time to time in matters which I think I perceive as evidently as can be. This will seem even more likely when I remember that there have been frequent cases where I have regarded things as true and certain, but have later been led by other arguments to judge them as false. (2:48; AT 7:70)

When I am not in a *cogito*-like condition, that is, not clearly perceiving, but instead only looking back on having previously been in such a condition, then my current judgment is not being determined by my clear apprehension of the truth. As Descartes sees it, my current reasons for believing that a triangle's three angles are equal to two

right angles run through my having once clearly perceived *and* a belief about my nature, namely that it is reliable in such a way that things that I clearly perceive are in fact true. (Sometimes this is described as a doubt about the reliability of memory, but that is misleading.) When I am in a *cogito*-like condition my perception of the truth determines my judgment. But what is there to determine my judgment now that I am no longer in a *cogito*-like condition, when the salient considerations are no longer clearly before my mind's eye, so to speak? Well, there is the fact that the salient considerations were once clearly perceived. But how does this help me make my way to the truth now, unless I make some assumption to the effect that when I previously perceived clearly, I got things right, i.e., my judgment was determined in accordance with truth? Until I have seen why this should be so, it seems that there will always be room to doubt things that I have previously clearly perceived but am not presently clearly perceiving: "Yes, I recall clearly perceiving it, but maybe I am so constituted that I go wrong even when I perceive clearly." Someone who has perceived the metaphysical underpinnings of her cognition can fill in this missing piece of the puzzle: she understands that the author of her nature is not a deceiver, and so she can see why it is the case that she has been made in such a way that what she perceives clearly is true. Thus, when she exits a clear perception, the doubt that can arise for someone who lacks an understanding of such things does not arise for her. She is fully certain.

One thing that can make it hard for us to follow Descartes's thought here is an almost unconscious tendency in modern readers to think of knowledge in more abstract terms, say, as a matter of having true beliefs that are justified in the right sort of way. If we think along these lines, then it is hard to make sense of the movement back and forth between "now you see it" and "now you don't" that seems to me essential to the way Descartes is thinking about epistemology. For – we would want to ask today – if in the midst of a *cogito* experience or while working through a geometrical demonstration, the meditator justifies a belief in the right sort of way to count as knowledge, how did the meditator subsequently *lose* that justification? Here it is important to recognize that, although Descartes may be the father of modern epistemology, he does not think of epistemology in terms of possessing abstract "justifications." For Descartes, a demonstration is, as I indicated a moment ago, not a "justification," but a way of seeing that something is so; and what I do when I perceive clearly is see that something is so. What achieving *scientia* enables me to do is to understand (now) why if I have (sometime in the past) perceived clearly that something is so, it is so.

Scientia, in the Aristotelian tradition, involves both certainty and systematic understanding. The same is true for Descartes. Even so, Descartes's handling of *scientia* is quite novel. To appreciate this, consider his suggestion, just explored, that there is a grade of certainty available to the geometer that involves extra-geometrical considerations. This marks a striking break with Aristotelian thinking about *scientia*. For Aristotelians, the certainty associated with *scientia* was supposed to flow from the first principles of a particular subject matter through to the conclusion. (These first principles, although better known in themselves, are not necessarily better known to us; particular geometrical propositions may be more obvious to us than the basic principles of geometry which account for them.) As the geometer sees how the theorem flows from principles that are, on reflection, self-evident, her knowledge becomes more certain. Here the certainty associated with *scientia* is acquired through a better command of one's

discipline. Descartes claims, as we have seen, that there is a fuller grade of certainty available to the geometer than this, that comes from her understanding of her nature as a cognitive being and its place within the universe that she knows. This is, in effect, to require as a part of the systematicity involved in *scientia* that there be a chapter that explains one's position as a knower.

Indeed, if there is such a thing as a "Cartesian" conception of knowledge, or such a thing as Cartesian foundationalism, I would be tempted to locate it here, in the broad thought that human knowledge in the fullest sense (call it *scientia* or whatever) necessarily includes a special kind of (perhaps *a priori*) perspective on our position as knowers. This idea, I think, has proven more influential than many of the particular details in Descartes's account of knowledge, and may well have eventually led to the idea, not present I think in Descartes's own thought, that having knowledge in the fullest sense involves being able to justify oneself.

Let's return to the Cartesian Circle. Keeping firmly in view the difference between clearly perceiving and *scientia* helps us to see why Descartes does not hold that I know everything I know *through* knowing the foundations of my knowledge, and so why there is no foundational circle. Perceiving clearly works whether or not I have reached *scientia*. To be sure, once I have reached *scientia* (by perceiving clearly the metaphysical underpinnings of knowledge), I will view my clear perceivings differently. I'll now take it that the things I clearly perceived in the past were perceived as they are, and so *scientia* will endow those things with a full certainty, that is, with a certainty that remains when I cease to perceive them clearly. But the fact that *scientia* extends the value of my clear perceivings in this way does not imply that the clear perceivings are themselves, at the time I'm having them, somehow less than certain, or only "psychologically" certain or all-but-certain.

One gets the appearance of circularity only when one collapses these two forms of cognition, clear perception and *scientia*, into some relatively flat sense of knowing. Then it does begin to look as if instead of saying that all *scientia* depends on clear perception of God (the metaphysical underpinnings of cognition), Descartes is saying that all knowledge depends on knowledge of God. The Second Objectors seem to have read him as working with a single, flat conception of knowledge. They object that, on his views, it follows that nothing could be known in the Second Meditation before God's existence was demonstrated: "you say that you are not certain of anything, and cannot know [*cognoscere*] anything clearly and distinctly until you have achieved clear and certain knowledge [*noveris*] of the existence of God," from which it follows that "you do not yet clearly and distinctly know [*clare & distincte scire*] that you are a thinking thing" (2:89; AT 7:124–5). They also object: "an atheist is clearly and distinctly aware [*cognoscere*] that the three angles of a triangle are equal to two right angles; but so far is he from supposing the existence of God that he completely denies it" (2:89; AT 7:125).

As might be imagined, Descartes responds indignantly. He complains that in the Fifth Meditation he said in "express words [*expressis verbis*]" that *cognitio* of God was required for the *subsequent* certainty of what is clearly and distinctly perceived (2:100; AT 7:140). Moreover, he protests that he never denied that an atheist could have clear and distinct *cognitio* of a geometrical theorem; he denied only that such cognition counts as *scientia* (2:101; AT 7:141). By ignoring Descartes's patient (even labored) explanation of how things currently clearly and distinctly perceived become

subsequently subject to doubt (for someone who does not know the author of her nature), and by neglecting his distinction between clear perception and *scientia*, the Second Objectors manufacture a difficulty where there is none.

Toward the beginning of this chapter, I said that it is natural to think that knowing the foundations of knowledge should somehow bolster or reinforce all of human knowledge, so that until we know the foundations we cannot know anything else, at least not in the fullest sense of knowing. We are now in a position to appreciate the sense in which this is true for Descartes. To be sure, it is not true for Descartes that knowing the foundations is necessary for any cognitive success. Perceiving clearly works without my understanding the metaphysical underpinnings of cognition. When I perceive clearly, the truth is revealed to me and I am aware of its being so revealed. However, simply perceiving clearly does not yield knowledge in the fullest sense, full certainty or *scientia*. (Descartes works this idea out in terms of the episodic character of clear perception, but one could imagine, I think, other ways of working out what is unsatisfying about having only clear perception.) According to Descartes, in order to have knowledge in its fullest sense, full certainty or *scientia*, one must have understood the metaphysical underpinnings of one's cognition (through clearly perceiving those underpinnings) and so, in effect, must have in one's possession a reflective, worked-out account of one's nature as a knower.

There is a second version of the Cartesian Circle that I'd like to mention which has to do with Descartes's employment of skeptical arguments in the *Meditations*. In the First Meditation, Descartes worries that the author of his nature might have made him so that he goes wrong in the simplest and most obvious matters, or, as he puts it later in the Fifth Meditation, that he might have "a natural disposition to go wrong from time to time in matters which I think I can perceive as evidently as can be" (2:48; AT 7:70). I shall follow custom and refer to this as the evil genius doubt (although in some ways "evil creator" or "imperfect creator" would be more accurate). In any case, the evil genius doubt is quite far-reaching, taking within its domain absolutely everything, no matter how evident (Descartes instances two and three added together are five, and counting the sides of a square and coming up with four as the answer, as examples of things that the doubt brings into question). This makes any attempt to refute it seem question-begging: any reasoning or argument that one might use while attempting to answer the doubt looks to require materials (premises, modes of inference, etc.) put at risk by the doubt.

Now, how much difference there is between these two versions of the Circle is open to dispute. If one thinks, as I am inclined to, that the primary function of the evil genius doubt is to bring it to the meditator's attention that she lacks a correct understanding of the foundations of her knowledge, then the versions of the Circle would be different ways of putting the same problem. That is, if what makes the evil genius doubt salient is either that I lack an account of the foundations of knowledge (as perhaps Descartes thinks the common person does) or that I have a mistaken conception of the foundations of knowledge (as perhaps Descartes thinks the Aristotelian Scholastic does, because she takes her basic cognitive relation to the universe to run through the senses), then to claim that I must refute the evil genius doubt before I could know anything at all would be equivalent to claiming that I must have a correct understanding of the foundations of my knowledge before I can know anything. So, in my

view, in the same way that I am certain that what I am clearly perceiving is true while I am clearly perceiving before I've discerned the foundations of knowledge, I am certain that what I am clearly perceiving is true before I've responded to the evil genius doubt.

But by the same token, if one did not think that the force of the evil genius doubt derives from the meditator's inadequate understanding of the foundations of her knowledge, then one might think that there is an important difference between the two versions of the Circle, and one might think, further, that even if Descartes is able to lay the foundations of knowledge in a non-circular way, he might be unable to answer the evil genius challenge in a non-question-begging way. Let me sketch one way in which this might go. This is something of a caricature, but not so far off, I hope, as to be a straw person.

Human knowledge, it might be suggested, necessarily begins from *representations* or, in Descartes's terms, *ideas*. All we have to go on, all we have access to, are our own representations or ideas. This being so, how is it possible for us to know anything besides our own ideas – or even that there is a truth or reality lying beyond our ideas? Perhaps these ideas are simply implanted in us by some evil genius. If one starts down this path, it becomes hard not to view clarity as only a property that some of these (suspect) representations have that others lack, and so it is an open question whether clear representations, even if possessing an internal order and rational coherence, really get us to truth or reality. Some such idea, I think, is a source of the view that prior to refuting the evil genius, even though our perceptions may be “rationally” in order and “internally” in order, they cannot be more than “psychologically” certain. In this setting, using my clear ideas to build up a case that my clear ideas get me through to the world is viciously circular. The thesis that representations with the property of clarity also have the feature of linking me to truth or reality needs some support *independent* of what my clear ideas supposedly show me, if it is not to be blatantly question-begging.

I do not have enough space to argue the case fully here, so let me simply register my sense that this problematic, as fascinating as it may be, is not Descartes's. Interpreters who understand Descartes as engaged in this problematic often depict him as resolving the problem by pointing out some supposed deep incoherence in the skeptical hypothesis that our thought does not connect us with reality. This has the consequence, as Janet Broughton has insisted, that there would need to be two philosophical moments in Descartes's handling of the evil genius doubt – a prior, negative one showing that the hypothesis that my thought does not connect me to reality is incoherent, and a subsequent, constructive one developing the metaphysical underpinnings of cognition. As Broughton points out, it is very difficult to discern an independent negative moment in the text (Broughton 1984: 599–600), and to the extent that it is there at all, it would seem to come after rather than before the constructive moment (Broughton 2002: 185–6).

I think that the negative moment is a phantom, invented in order to give Descartes a solution to a problem that is alien to his thought. For one of the most important things we discover in the *Meditations*, quite early on, in the *cogito* passage (Archimedean point that it is), is that our thought does connect us to the *truth*. Consider again the conclusion of the *cogito* passage: “So after considering everything very thoroughly, I must

finally conclude [*denique statuendum sit*] that this proposition, *I am, I exist*, is necessarily true [*necessario est verum*] whenever it is put forward by me or conceived in my mind" (2:17; AT 7:25). This is a pivotal moment for the meditator: she *sees* that she exists, and so discovers that she has the remarkable ability to see that things are so, to grasp the truth (a good deal of the rest of the *Meditations* is devoted to explaining how this remarkable achievement is possible). While she perceives that she exists, she can tell that there must be something wrong with the evil genius doubt, even if she cannot say what and even if once she exits her clear perception the doubt can recur in its full generality. Current clear perceivings are never mere representations, of doubtful relation to reality. To think otherwise – to understand the *cogito* experience as if there is room for a metaphysical doubt that is somehow not currently available to the meditator transfixed by the clarity of her perception – is to forget what perceiving clearly *is* for Descartes and to surreptitiously replace it with something like a two-dimensional Berkeleyan idea.

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Chapter 19

Cartesian Innateness

ALAN NELSON

The doctrine of innate ideas is among those at the core of Descartes's system of philosophy. It plays a very prominent role in his early unpublished work, *Rules for the Direction of the Mind*, and figures in his correspondence until 1637 when it is again emphasized in the *Discourse on Method*. The *Meditations* and *Principles* make much use of it. And in 1648, less than two years before his death, the doctrine is elaborated in the *Comments on a Certain Broadsheet* and in the *Conversation with Burman*. In the Latin title of the *Rules*, *Regulae ad Directionem Ingenii*, the word *ingenium* is more accurately (though less gracefully) translated as "native intelligence" than as "mind." Indeed, what is innate, native, inborn, implanted (as seeds), primitive, or primary to the mind is intimately connected with Descartes's metaphysics, epistemology, and philosophical and scientific method.

It is unfortunate that despite the ubiquity of innate ideas in his works, it never became part of Descartes's expository strategy to write down in a single place exactly what were the doctrine's systematic functions. Consequently, when Descartes's readers, both his contemporaries and ours, approach his scattered pronouncements, they find apparent inconsistency, confusion, or triviality. The plan of this chapter is first to construct a systematic exposition of the doctrine of innate ideas. We shall see philosophical and textual reasons for concluding that Descartes had a consistent, highly systematic theory of innate ideas. This account will then be used to address the many criticisms and objections that have accumulated over the centuries. We shall conclude by briefly reviewing the striking fact that some of Descartes's main positions and arguments are still in play in modern cognitive psychology in forms very close to the originals. They are, of course, no less controversial now than they were among Descartes's contemporaries and immediate successors.

To bring out the unified, systematic features of Descartes's theory of innate ideas, an explanatory strategy he employs in a different context can again be made to serve well. In his early work, *The World*, Descartes wishes to explain observed natural phenomena by an appeal to fundamental laws of nature. The scientific explanation would lose much force, however, if it were applied to the fully formed world stocked with living things that is described in Genesis. Descartes wanted to understand laws connected with the essence of things and not laws that might have been tailored to fit a very special set of "initial conditions." Consequently, in *The World*, Descartes sets out to

explain how the world as we presently observe it could have arisen from God's creating extension in chaotic motion. The point is that since his laws of nature suffice to evolve the phenomena we now observe from any initial conditions, we have an explanation of phenomena from fundamental principles. Descartes realized that this explanation conflicted with the doctrine then required by faith according to which the world was created in its present form "five or six thousand years ago," so he proceeds "in the guise of a fable," asking his reader to "allow your thought to wander beyond this world to view another world – a wholly new one which I shall bring into being before your mind" (1:90; AT 11:31–2). Although Descartes never published *The World*, he was so pleased with this expository device that he recounted it in the *Discourse* (1:131–3; AT 6:41–5) and produced another version of it in his *Principles* (1:257; AT 8A:101–2).

So let us now consider a parallel fable in which God creates thinking things (minds) instead of an extended world. The goal in physics is to start with some very clear principles and then to demonstrate the rest of the subject matter from these seeds of knowledge. The same holds for a science of the mind. We begin the investigation with a few innate ideas as seeds and then show how the rest springs from them. Thought will be explained not by working backwards from the observed, but instead by demonstrating how thought can arise from fundamental metaphysical principles (1:208–9; AT 8A:23; and 1:32; AT 11:399). Now in this story – let us call it the Fable – what is going to count as the innate, inborn, implanted structure of these minds? Another way of asking this question is to consider what are the minimal elements that must be implanted at the creation of any mind such that all the richness in its thought is, as it were, generated? We can set aside for the present ideas for which the created minds are themselves partially responsible. Later it will become clear how that class of ideas, roughly the "factitious" or made-up ideas of the Third Meditation, can be constructed or generated from the simple innate ideas that are entirely due to God. That will constitute an explanation of the sort much esteemed by Descartes.

It is obvious how to begin the inventory of structures that God implants in the minds that he creates in the Fable. These thinking things will have an innate idea of themselves as thinkers. Descartes's metaphysical method requires that one begin with a clear and distinct perception of one's own thought. When one follows this method of meditative metaphysics as presented in works like the *Meditations*, the idea of one's own thought is the first to become clear and distinct, and it is in this special sense the first and best-known truth. This reflexive self-awareness reveals the idea of thought as innate in the strongest possible sense (2:113; AT 7:160). God also instills an idea of himself rather like a craftsman's mark, so the idea of God is also, of course, innate to minds. And since this idea contains the most objective reality, it is in that respect prior to other innate ideas. Another part of the innate architecture that is imparted to thinking things at their creation is an idea of extension from which flows knowledge of geometry, thereby constituting knowledge of the essence of matter. These familiar and mostly uncontroversial cases number only three innate ideas so far. But as we shall see in what follows, this group – call it the thought/extension/God group – gives the thinkers far-reaching capabilities.

It is of great importance that each of these innate ideas is clearly and distinctly perceived when philosophizing in the correct order. Whatever is clearly and distinctly

perceived is true; and the infinite creator, being no deceiver, imparts to his created thinking things true ideas which give them knowledge of God and what he creates. But according to Descartes, many thinkers never do clearly and distinctly perceive anything at all, and even the most careful philosopher is usually thinking with ideas that are to some extent confused and obscure. How tight, then, can the connection between innateness and clarity and distinctness be? Is every clear and distinct perception of an innate idea? Are innate ideas sometimes confused? If so, their special epistemological role appears seriously compromised. If innate ideas are not always actually present, but are instead dispositions, then it is hard to understand the sense in which they are innate. Finding Descartes's best answers to these questions requires an examination of the basic ontology of ideas. It will turn out that the theory of clear and distinct perception is of a piece with the theory of innate ideas.

The apparently problematic equivalence between innate ideas and clear and distinct perceptions can be better articulated by developing some of Descartes's theory of the latter, and we shall come to this; first, however, we must address the pressing interpretive difficulty presented by innate ideas that are not occurrently clear and distinct. The difficulty is to be removed by allowing innate ideas usually to be obscure and confused without diminishing their epistemic status. ("Obscure and confused" is Descartes's terminological complement of "clear and distinct"; see 1:207; AT 8A:22.) What is first needed, therefore, is an explanation of how ideas become obscured and confused in the first place. We know that for Descartes, confused ideas are tightly connected with the mind's embodiment and sensory perception, and with consequent imagining and remembering. Ordinary sensation results in confused ideas and interferes with minds' distinct perception of the ideas innate to their thought. In our Fable, God must fashion the thinkers with the capacity for sensory ideas if everything in thought is to be explained. These are the ideas that are informally characterized as coming from the faculties of sensation, imagination, and memory. Our question, therefore, is how confusion and falsity typically arise in connection with sensory ideas.

All ideas are in one sense true: they contain no intrinsic falsity when they are regarded strictly as modes of thought. Most ideas are materially false, however, because they provide "subject matter" for false judgment (2:39; AT 7:56; for a full treatment of material falsity along these lines, see Nelson 1996). Maximally clear and distinct ideas are distinguished by their not providing subject matter for false judgment; whatever is unqualifiedly clear and distinct is unqualifiedly true. One way of understanding this is to emphasize that to affirm a clear and distinct idea involves no error. These affirmations do not extend to any of the imperfect contributions or additions that the thinker makes to the idea, so no privation or limitation is imposed on such a perception by the thinker's own activity. In other words, clear and distinct perceptions contain nothing except what proceeds from the perfection of the thinker's infinite, non-deceptive creator. In Rule 8, Descartes writes that "there can be no falsity save in composite natures which are put together by the intellect" (1:32; AT 10:399). The point is elaborated in Rule 12:

[S]imple natures are all self-evident and never contain any falsity. This can be easily shown if we distinguish between the faculty by which our intellect intuitively knows things and the faculty by which it makes affirmative or negative judgments. (1:45; AT 10:420)

The same idea appears about fifteen years later in a letter to Mersenne:

Altogether, I think that all those [ideas] which involve no affirmation or negation are innate in us; for the sense-organs do not bring us anything which is like the idea which arises in us on the occasion of their stimulus, and so this idea must have been in us before. (3:187; AT 3:418)

So ideas that involve no affirmations or judgments that go beyond the ideas themselves are unreservedly true. In other words, ideas to which a thinker contributes no additions, to which no obscuring judgments are attached, are true. In short, the ideas that are created as a thinker's initial structure and do not depend on judgments added on by the thinker are true. This nativism is the ontological ground of the famous truth rule of the Fourth Meditation. Whatever is clearly and distinctly perceived is part of the innate structure created by the non-deceiving God. So if one is careful to affirm only what is clearly and distinctly perceived, one affirms what is true. Falsity results from the privative contribution of the finite thinker to his own thought. So we have been brought back to the Fable and the inborn, innate ideas characteristic of Descartes's philosophy.

Descartes's treatment of truth/falsity and distinctness/confusion might seem to provide a tidy, but ultimately very misleading, classification by which thought/extension/God are associated with distinct perception and sensory ideas are associated with confused perception. And this scheme seems supported by the famous tri-fold classification of ideas as innate, or adventitious, or factitious in the Third Meditation. Are then the confused ideas arising from stimulation of the sensory organs part of the innate structure with which the mind is created, or are they "adventitious," coming to the mind from the outside – the possibility raised in the Third Meditation?

At this juncture, Descartes's critics grimly answer by pointing out that Descartes unequivocally characterized sensory ideas as innate, thereby crosscutting the potentially neat epistemological criterion for innateness. If sensory ideas are both confused and innate, then innateness cannot be generally linked with distinctness and knowledge. A critical text is in the *Comments* where Descartes wrote:

[T]here is nothing in our ideas which is not innate to the mind or the faculty of thinking, with the sole exception of those circumstances which relate to experience, such as the fact that we judge that this or that idea which we now have immediately before our mind refers to a certain thing situated outside us. . . . [T]he very ideas of the motions themselves [transmitted by sense organs] and of the figures are innate in us. The ideas of pain, colours, sounds and the like must be all the more innate if, on the occasion of certain corporeal motions, our mind is to be capable of representing them to itself, for there is no similarity between these ideas and the corporeal motions. (1:304; AT 8B:358–9)

In light of these considerations, it has often been noted that Descartes's assigning the status of innateness to sensory ideas is driven by his replacement of Scholastic Aristotelian theories of perception. Descartes combined a mechanical account of the physiology of perceptions with the concomitant occasioning of sensory ideas (Buchdahl 1969; Adams 1975). It is impossible that anything extended literally enters the mind as the Scholastic theory seems to require. This has led commentators to object that

Descartes is attempting to mobilize innate ideas for at least two disjoint tasks. One is providing thinkers with cognitive contact with fundamental metaphysical truths. The other is underwriting the revolutionary, mechanical theory of sensory perception. The alleged muddle, then, consists in lumping the distinctly perceivable innate ideas (and their special epistemological role) together with the sensory ideas (and their special explanatory role in the theory of sensory perception). Descartes's sensory ideas have been taken to exemplify materially false, confused ideas that can give us only uncertain information about particular things outside our thought. This is one of the grounds for the more general allegation that Descartes's doctrine of innate ideas ends up muddled because he tried to accomplish too many inherently diverse things with it (see, for example, Buchdahl 1969; McRae 1972; Jolley 1990). We seem moreover to be left with a "trivial" sense in which all ideas are innate without exception.

The charge that Descartes is here muddling two philosophical issues is too hasty and cannot be made to stick. To defend the coherence of Descartes's theory and develop his real position we should start by removing one of the apparent divides between sensory ideas and the self/God/extension group of innate ideas. This is the apparent divide in epistemic status: the former are connected with confusion and obscurity, while the latter are clearly and distinctly perceivable and yield metaphysical knowledge. In this context, it is easy to ignore the important fact that Descartes does specify special circumstances in which sensory ideas are clearly and distinctly perceivable. A useful statement of this is in the *Principles*. The typical circumstance in which our sensory ideas are indeed confused and falsified results from our making bad judgments concerning their connection with things outside our thought. But these errors are avoided if we are "[v]ery careful to note that pain and colour and so on are clearly and distinctly perceived when they are regarded merely as sensations or thoughts" (1:217; AT 8A:33). This theme is developed in the Sixth Replies in the context of answering a question about the relative epistemic roles of the intellect and the senses. Descartes there distinguishes three grades of sensory response. The first is the purely corporeal response to an external stimulus, and the second comprises the "immediate effects produced in the mind as a result of its being united with a bodily organ" (2:294; AT 7:437). The third grade of sensory response comprises the judgments made concerning external objects – judgments typically made because of habits ingrained in childhood. These judgments concern "those circumstances which relate to experience" (the phrase quoted above from the *Comments*), including our individuating external items and what is attributed to them. Without special philosophical effort, these judgments will obscure and confuse the second grade, in which "no falsity can occur" (2:296; AT 7:438). Conversely, if no affirmation or denial were added to these immediate effects in the mind, the second grade would be clear and distinct and bring along the affirmation of its truth, just as was noted above. This truth and its basis in the innate must be considered shortly.

First, however, it is important to reconsider the import of the text from the *Comments*. We can now see that Descartes is stating here that the only sensory ideas that are not innate are those resulting from our confusion-producing judgments about things outside our thought. This tightly parallels the Sixth Replies (quoted above) in saying that it is judgment about the external causes of our ideas that typically obscures and confuses them. A technique for regarding sensory ideas simply as the "immediate

effects" in the mind of its being unified with the body would be a technique for making our innate sensory ideas clear and distinct. To appreciate the parallel between sensory ideas and the other innate ideas, it is important to see that the philosophical reflection that results in a clear and distinct perception of God, for example, will typically be initiated by some sensory awareness connected with sensation, imagination, or memory. It might be one's hearing the word "God" or seeing an appropriate inscription or picture, or again imagining or remembering such a sensory image. This is certainly not to say that the idea of God is corporeal; it is instead to say only that the beginning of a cognitive route to the clear and distinct perception is almost always a confused sensory representation. Similarly, a judgment resulting in a confused sensory idea might first be triggered by motions in the sensory organs. Being visually stimulated by an apple, for example, might trigger the habitual judgment that redness is in the apple. Removing such confusions and rendering a complex sensory idea into some clear and distinct innate idea requires reflection on the confused complex. If one were to accept the Fable as non-fiction, then one would have a unified account of how innate ideas function in sensation and metaphysical thought – contexts that have appeared to be disparate. That in turn would be close to establishing a unitary account of the four innate ideas or classes of ideas we have so far discussed. There are innate sensory ideas, but all of our ideas, including these, become confused by judgments about external things.

It remains to consider the epistemological function of the innate sensory ideas in metaphysics (as opposed to practical matters). This means characterizing the truth that their clear and distinct perception makes manifest. The answer must be that it is knowledge of "what belongs to the union of the soul and the body" (3:227; AT 3:692) and, in a way, knowledge of the union itself. This cannot be knowledge of how mind and body are somehow fused by the infinite power of God; when we distinctly consider thought and extension as candidates for unification, we perceive their real distinction. It is instead knowledge of the fact that the human being is a unity. In view of the sharp, nearly universally negative reception of Descartes's treatment of the human being as a union of really distinct substances, it might seem strange that he maintained that the union itself is accessible through a truth-tracking innate idea. He leaves no doubt, however, that the idea of union is "inborn," "primitive," or "primary," all familiar synonyms for "innate":

First I consider that there are in us certain primitive notions which are as it were the patterns on the basis of which we form all our other conceptions. There are very few such notions. . . . Lastly as concerns the soul and the body together, we have only the notion of their union. . . . I observe next that all human knowledge consists solely in clearly distinguishing these notions and attaching each of them only to the thing to which it pertains. . . . It is in our own soul that we must look for these simple notions. It possesses them all by nature, but it does not always sufficiently distinguish them from each other, or assign them to the objects to which they ought to be assigned. (3:218–19; AT 3: 666–7, emphasis added; see also 3:357; AT 5:222 and 1:209; AT 8A:23)

Descartes held that thought is usually and predominantly very confused, but also that a careful philosopher can work at distinguishing the confused elements until they are clearly and distinctly perceived. The parallel between sensory ideas and the self/

God/extension group is confirmed by the plain fact that philosophical skill is also needed to render self/God/extension clear and distinct. We have these ideas from birth, but we have them confusedly prior to philosophical training. In other words to “have” an innate idea, even to have it occurrently, does not require that it be clearly and distinctly perceived at that time. Humans have the “capacity” to clearly and distinctly perceive the innate ideas that they have confusedly in exactly that way. Concerning adults, for example, Descartes notes that anyone who can use the word “God” meaningfully shows that he has the idea, but this linguistic skill definitely does not require a clear and distinct perception (3:185; AT 3:393–4).

The principal technique for exercising our capacity to make confused perceptions of innate ideas clear and distinct is, of course, the famous meditational process that involves the device of hyperbolic doubt. (For a fuller account of the connection between meditation and innateness, see Newman 2005.) This enables one to abstract the target innate idea away from the obscuring results of metaphysically bad judgments. When the processes of “distinctification” are prosecuted to the end, the result is a clear and distinct perception of an innate idea (cf. Leibniz 1981: 100). This is how an idea that is innate can still be “learned,” something that has struck some commentators as impossible (see Kenny 1968: 102–3). When innate ideas are described as implicit, submerged, potential, faculties, capacities, or dispositions, this is to be unpacked as describing them as being usually confused and obscure.

This interpretation of Descartes’s theory of innate ideas as a fully unified conception has made use of a correlative interpretation of the dichotomy between clear and distinct ideas, on one hand, and confused and obscure ideas, on the other. This connection should be made more explicit. An important starting place that is reflected in Descartes’s terminology is that the class of clear and distinct ideas complements the class of confused and obscure ideas (1:207–8; AT 8A:21–2). So confused ideas provide subject matter for false judgments and they contain the results of previous contributions from the thinker (in the form of earlier false judgments). Distinct ideas, by contrast, provide no material for false judgment – on the contrary, the will inevitably affirms their truth. This is in accord with statements of the “rule of truth,” for example, (a) Whatever is clearly and distinctly perceived is true, and (b) To assure truth, withhold affirmation whenever able. A competent meditator will be able to methodically doubt anything but a clear and distinct perception (see, for example, 2:41; AT 7:59 and 1:207; AT 8A:21). So there are strong grounds for thinking that Descartes holds that a confused idea is always an indeterminate mélange of simpler elements. It can be made less confused (more distinct) by separating off component ideas – literally by distinguishing them one from another. How is this to be accomplished? Descartes’s favorite method, and the surest, is the meditational one practiced in its purest and most complete form in the *Meditations*, although it appears in truncated or summary forms in the *Search After Truth*, the *Discourse*, and the *Principles*.

Confused ideas are compounded ideas; they have elements that are literally confused in thought. Perfectly distinct ideas are perfectly simple. Beginning with confused ideas, one can progress toward distinct perception by distinguishing the ideas that are confused together. In other words, an idea is confused when a thinker regards it as a unit while not realizing that it is literally a fusing together (con-fusion) of component ideas.

It happens in almost every case of imperfect knowledge that many things are apprehended together as a unity, though they will later have to be distinguished by a more careful examination. (2:300; AT 7:445)

Whenever we call a conception obscure or confused this is because it contains some element of which we are ignorant. (2:105; AT 7:147; see also 1:32; AT 10:399)

We now have an explanation of the confusing and obscuring judgments that result in confused and obscure ideas. Erroneous judgments concerning the objects of sense are the main culprit. (Of course, these errors arise from lack of metaphysical rigor, but are often appropriate and useful in dealing with what is beneficial or harmful for the union: 2:57; AT 7:83.) It is significant that confusion results from our own judgment and does not derive directly from God. Only the clearly and distinctly perceivable ideas, the true ones, constitute the created structure of finite thinking things. The confused ideas contribute to the privation of perfection in the finite thinker. John Cottingham made the important observation that Descartes's innate ideas are like "logical building blocks" from which other truths can be constructed (Cottingham 1976: xxxv–xxxvi), but he does not bring out how they are also the ultimate residue of analyzing falsity (Nelson 1997). So confused ideas have their elements fused together by false judgments. We might say that these judgments are themselves confused because they do not result in truth, but they are also literally confusing (i.e., con-fusing) because they heap further obscurities into the compounded idea. For example, if one were to judge that the sun is 200 feet in diameter on the basis of a visual image, the confused visual image is compounded with the judgment that the object causing it is 200 feet in diameter. The next thought one has of the sun is likely to include the judged size along with a visual image, and this next thought is not likely to be an explicit conjunction of two distinct items; instead, the image and the judged size will be confused with each other. This confusion is additional to what is already in the image: extension, color, warmth, the name "sun," etc. We can, incidentally, now see the provisional classification of ideas in the Third Meditation in a new light. All ideas are composed from the four innate ideas, so in one sense all ideas are innate. Ideas are adventitious, however, when they involve the third grade of sensory response: confusing judgments about what is outside thought.

It is natural to ask at this point how it is that our ideas ever become confused in the first place. Our Fable has all our ideas being constructed from our initial complement of epistemically distinguished innate ideas. If there is nothing to work with in the beginning but innate ideas, how can judgments that confuse them get off the ground? To answer this it must be remembered that the creation of thinking things is only part of the creation of human beings. Human beings are primarily drawn to the truths directly relevant to human nature and not to the metaphysical truths revealed by clear and distinct perceptions of innate ideas (2:57; AT 7:83). This means that God has ensured that infants make judgments which are conducive to the preservation of the union even though they lead to the confusing and obscuring of metaphysical truth. Most early modern philosophers found it pointless to speculate about the details of pre-linguistic infantile cognition. This was sometimes for theological reasons (as in Descartes), or empirical reasons (as in Hume), or for methodological reasons (as in Kant).

Our introductory Fable has progressed to the point where the specifications for the created thinkers include Self/God/Extension and sensory ideas. Moreover, the primitive idea to which all sensations are referred is the idea of union. We can, therefore, consider the current list of innate ideas to number four: Self/God/Extension/Union. Let us now return to the Fable and consider the question of innate ideas beyond the four. One suggestion for adding to this list might be drawn from Descartes's famous discussion of nativism in the Fifth Meditation. Descartes there discusses extension in the context of mathematical inference. He chooses the clear and distinct perception of the "true and immutable nature" of a triangle as his main example. If an innate idea of triangle is added to the established group of four, then square, pentagon, and an infinity of other geometrical ideas cannot be proscribed. A similar suggestion would be to include separate innate ideas for all the sensory items referred to the union: colors, smells, pains, and so on. If the Fable must continue with God's imbuing an infinity of discrete innate ideas in the thinkers, then the story can hardly be understood literally. It would seem that only an infinite thinking thing could literally think an infinity of ideas, and it does not seem to help that these ideas could typically be confused together in a finite thinker. This creates pressure to retell the Fable in a more familiar way to scholars of Descartes so that the innate ideas are created only as dispositions, with all of their attendant philosophical problems (as partially enumerated in Stich 1975). More generally, the Fifth Meditation's use of innate ideas to ground the deduction of geometrical properties and the necessary existence of God has been taken as another instance of Descartes's failure to systematize his treatment of innate ideas (as in McRae 1972).

We might choose to hold to our original, simple Fable by attending to the fact that triangle, square, etc., are all extended figures. These figures are ways of thinking about extension obtained by taking extension to be characteristically bounded, limited, and defined. These "ways" or modes of thinking about extension involve the imagination, "distinct imagination" when the perceptions are properly arrived at and very certain (2:44; AT 7:63–4). It is also possible for someone trained in mathematics to use language instead of imagined lines bounding extension to arrive at mathematical truths. Someone trained in mathematics might, for example, arrive at the thought of a thousand-sided figure without distinctly imagining a thousand sides at that time, provided that he can appropriately deploy the words "thousand-sided figure" or "chiliagon" as symbols for limitations of extension. This suggests that every geometrical perception yielding metaphysical knowledge picks up the same true and immutable nature – extension. The variety of mathematical perception and knowledge comes from the variety of ways in which the imagination can limit extension. So if the imagination of words or approximations of lines leads us to perceive the innate idea of extension, the perception can be very clear and distinct. The great flexibility with which the imagination enables us to regard true and immutable extensive nature accounts for Descartes's insistence that while extension can be known by the intellect alone, it is better known when aided by the imagination. It is thereby better known because our ways or cognitive approaches to knowing are multiplied. If we are forced to cut through this flexibility and choose one true and immutable nature for inscribed figures (2:84; AT 7:118) and other complex figures, the only plausible candidate is extension itself (or the innate idea thereof; see Nolan 1997).

Another powerful consideration in favor of reducing all the geometrical innate ideas to the idea of extension comes from the *Rules*. One striking case is the example of the triangle and how it figures in geometrical deductions:

For example, I can have knowledge of a triangle, even though it has never occurred to me that this knowledge involves knowledge also of the angle, the line, the number three, shape, extension, etc. But that does not preclude our saying that the nature of a triangle is composed of these other natures and that they are better known than the triangle, for it is just these natures that we understand to be present in it. (1:46; AT 10:422)

The triangle is Descartes's example of a geometrical innate idea in the Fifth Meditation, and it is the example most often seized upon by his commentators. But here we see the triangle's nature exposed as a composition. Or, more precisely, this nature might be regarded as a simple relative to a theorem that follows from it. But angle, line, etc., are simpler and still more basic. In fact, the idea of angle decomposes into lines, and the number three is itself composite, and so on. Is there a regress of simplicity here? No, extension is "maximally absolute." Extension is the maximally simple nature from which all the other geometrical natures derive in virtue of their all "sharing" it (1:21; AT 10:382) – they are different delimitations or ways of thinking it. It is interesting to note that this means that a cognition of a triangle as a tri-angular, closed plane figure is not perfectly simple. Such a cognition includes the imagined sides and angles (or their symbolic surrogates). It follows that thinking a triangle in this way cannot be perfectly clear and distinct. Perfect clarity and distinctness would require the ultimate distinctification to extension itself.

Thought/God/extension/union are thus the ultimate simples from which all the others are composed in the *Rules*. A fuller treatment of how mathematical innateness reduces to the innate idea of extension is in Nolan (2005). There is not space here to develop a parallel reduction of innate sensory ideas to the simple nature of the human being, union, but the considerations are very similar. The main difference is that the various ways of regarding union depend more on sensations (including appetites and emotions) and less on imagination (2:51–2; AT 7:73–5; 3:227; AT 3:692). Just as extension can be delimited by being compounded with imagined lines, union can be delimited by color, pain, and so on.

Yet another suggestion for expanding the set of innate ideas required for a thinking thing would be to include common notions or axioms. These comprise not only the ones listed by ancient geometers, but also such metaphysical propositions as " 'What is done cannot be undone'; 'He who thinks cannot but exist while he thinks'; and countless others" (1:209; AT 8A:24). Descartes does not explicitly refer to these items as innate, but they are clearly and distinctly perceivable (1:209; AT 8A:24), and we have seen that this is coextensive with innateness. In telling the Fable, we now must decide whether the creator will include common notions as part of the minimal structural basis of thought. As in the case of mathematical ideas, common notions turn out to be derived from simpler ideas; the perception of a common notion does not correspond to a simple thing in the world (1:208, 209; AT 8A:22–3). Descartes explains how this works for the common notion "Shape is the limit of an extended thing," focusing on how the ideas of "shape" and "limit" function in the proposition:

That is why, since we are concerned here with things only insofar as they are perceived by the intellect, we term 'simple' only those things which we know so clearly and distinctly that they cannot be divided by the mind into others which are more distinctly known. . . . This point is to be taken in a very general sense, so that not even the things that we occasionally abstract from these simples are exceptions to it. We are abstracting, for example, when we say that shape is the limit of an extended thing, conceiving by the term 'limit' something more general than shape, since we can talk of the limit of a duration, the limit of a motion, etc. . . . [S]ince the term 'limit' is also applied to other things – such as the limit of a duration or a motion, etc., things totally different in kind from shape – it must have been abstracted from these as well. Hence, it is something compounded out of many quite different natures, and the term 'limit' does not have a univocal application in all these cases. (1: 44; AT 10: 418–19)

What is crucial here is that while shape and limit can be regarded as relatively simple, they are abstracted from what is more simple – extension (in the case of shape) and other things (in the case of limit). In both cases, especially in the case of limit, the abstractions involve the compounding of simpler ideas. Even the (general) idea of created substance is in this way abstracted, and therefore compounded from the ideas of thought and extension (1:210; AT 8A:24, and 1:215; AT 8A:31). If the creator in the Fable requires that his thinkers have the capacity to think common notions, then thought/God/extension/union once again suffice. (For a fuller treatment of Descartes's handling of abstractions and universals, see Nolan 1998b.)

Descartes would seem justified in insisting that there are ultimately only four innate ideas that can be maximally clear and distinct. He could still allow that the things these ideas represent can be thought of in various ways depending on what cognitive route is followed in arriving at a clear and distinct perception. Alternatively, he can say that every way of thinking one of the four fundamental ideas deserves to be called an "innate idea" in its own right. How one does the count is ultimately a merely verbal issue. Every one of these ideas that we give its own name represents the same object as the fundamental innate idea it names. For example, if we let "triangle," "square," "pentagon," etc., be names for ways or modes of thinking about extension, then these will name attributes in the technical sense of that term given in the *Principles* (1:214; AT 8A:30; for a treatment of this important text, see Nolan 1997). This means that triangle and the rest are only distinguished from extension "conceptually."

Let us now review the familiar allegations of fatal difficulties in Descartes's theory of innate ideas. Most of these stem from his characterization of innate ideas as faculties, potentials, capacities, or dispositions. Can we plausibly say that minds "have" innate ideas if they occasionally, or never, perceive them clearly and distinctly? As we have seen, Descartes must allow that many humans never have a clear and distinct perception and that those who do enjoy them are not constantly in the grip of clarity and distinctness. No human, furthermore, has a clear and distinct perception as a fetus or infant. Descartes has seemed trapped between these facts and his commitment to thought's being structured by innate ideas. Must innate ideas be occult powers to produce occurrent perceptions when appropriately occasioned? A standard critique of this kind of position from a contemporary perspective is in Stich (1975: introduction).

The minds produced in our creation Fable are subject to none of these difficulties. The thought of these minds typically consists in a confusion of countless judgments,

sensations, etc. In this typical state of confusion and obscurity, the minds are definitely not clearly and distinctly perceiving innate ideas. They are, nonetheless, confusedly perceiving their innate ideas. Their confused thought is constituted by the confusion of the ultimately simple, primary ideas that are the mental materials from which all thought is constructed. Given this interpretation, nothing could be more natural than to say that all minds “have” innate ideas as long as they exist. Even as fetuses or infants their thought is a confusion of the innate ideas. It is also perfectly natural to say that a mind has a disposition or capacity for clearly and distinctly perceiving its innate ideas. Under what conditions is the disposition activated? This occurs when the mind makes confused thought distinct. Descartes often carefully explains how this is done; again, the *Meditations* account of the process of distinctification of the ideas of mind, God, and extension is paradigmatic. In short, a mind always “has” innate ideas which usually constitute the multiply confused items of indistinct thought. This justifies describing the ideas themselves as disposed to become distinct when the right sorts of cognitive exercises are performed. We are justified, for the same reason, in saying that the mind has the “capacity” or “disposition” to clearly and distinctly perceive the innate ideas. Clearly, these so-called “capacities” or “dispositions” are ontologically fully grounded and nothing like the Aristotelian potentialities rejected by most modern philosophers. It is instructive to compare this interpretation with Robert McRae’s (1972) treatment of the connection between innateness and reflective knowledge. McRae picks up on Descartes’s effort to distinguish implicit from explicit knowledge. The idea of God, for example, is implicit in the *cogito* and in a way prior to the idea of the mind, but the latter is prior in the sense that it first becomes explicitly known in the course of the *Meditations*. McRae analyzes the implicit/explicit distinction into degrees of attentiveness. Knowledge is explicit to the degree to which it is attended to. It is implicit insofar as it is not attended to. This analysis can get a foothold in Leibniz because of his theory of unconscious perceptions. In Leibniz there is a connection between the degree to which a perception is conscious and its claim on the attention. Descartes cannot make such an appeal to degrees of consciousness that tail off into subconsciousness. As Margaret Wilson emphasizes (1978: 154–65), the mind is aware of everything in its thought. What Wilson terms the epistemic transparency of Cartesian thought collapses any implicit/explicit distinction that could help with the old problem about innate ideas as dispositions. We don’t want to say that the infant is always aware of the idea of God floating around in its thought, but is regarding it inattentively. The Fable, however, allows us to associate the implicit with the confused and the explicit with the distinct. An infant has an idea of God that is so confused it is not recognized as such. Its knowledge of God is, therefore, implicit in the sense that the confused idea can later be made distinct. Minds are always aware of confused ideas, and these confused ideas ultimately consist in the con-fusions of innate elements. So when a confused idea is mistakenly regarded as a simple, it can still be clear if on some occasion it gets most of a mind’s attention. Recall that Descartes links clarity with attention when defining and contrasting “clear” and “distinct” at 1:207–8; AT 8A:22. But a confused idea, albeit a clear one, does not constitute explicit, distinct knowledge of any innate idea. McRae errs, therefore, in supposing that attention always yields distinctness as well as clarity.

It is time to consider the status of our Fable. It was introduced in response to the complaint that Descartes never presents in one place a unified treatment of innate ideas.

That complaint has led recent critics to the conclusion that there is no unified treatment, so that innate ideas are part of a muddled attempt to bring inherently diverse considerations under one theoretical umbrella. We have seen there is good reason to suppose that the theory made explicit in the Fable is in fact Descartes's own and that he was advancing it in the various texts bearing on innate ideas. If we were instead to conclude that Descartes did not trouble to weave together the various threads he was trying to follow, the Fable would still serve to show how his position would need to be adjusted to preserve the philosophical advantages of the general doctrine.

The issue of innate mental structure shows surprising legs as it runs into the twenty-first century. The main impetus has been from Noam Chomsky's contributions to the foundations of cognitive science. Many of his principal arguments were brought out with provocative historical parallels in the early book *Cartesian Linguistics: A Chapter in the History of Rationalist Thought* (1966). Chomsky argues that humans' knowledge of their first language exceeds the experiential base available to them. The poverty of stimulus is especially striking for young children, a fact that recalls Socrates' geometric midwifery with the boy in Meno. Part of the process of first language learning, Chomsky concludes, must depend on innate structure. In this context, Chomsky quotes with approval from Herbert of Cherbury, Cudworth, and Descartes's Fifth Replies (Chomsky 1966: 60–9). The passage from Descartes is this:

I do not, incidentally, concede that the ideas of these figures ever came into our mind via the senses, as everyone commonly believes. . . . Geometrical figures are composed for the most part of straight lines; yet no part of a line that was really straight could ever affect our senses, since when we examine through a magnifying glass those lines which appear most straight we find they are quite irregular and always form wavy curves. Whence, when in our childhood we first happened to see a triangular figure drawn on paper, it cannot have been this figure that showed us how we should conceive of the true triangle studied by geometers, since the true triangle is contained in the figure only in the way in which a statue of Mercury is contained in a rough block of wood. But since the idea of the true triangle was already in us, and could be conceived by our mind more easily than the more composite figure of the triangle drawn on paper, when we saw the composite figure we did not apprehend the figure we saw, but rather the true triangle. (2:262; AT 7:381–2)

In other words, knowledge of the true triangle cannot be explained by recourse to empirical strategies; true triangles never are perceived by the senses. On the contrary, the explanation of the ability to discriminate triangular shapes in the environment must be explained by prior knowledge of triangles. This text is also significant for its likening of the triangle in the drawn figure to the statue in the rough block of wood. Of course, the statue is in the wood only in the mind of the sculptor, but in the mind, the innate idea of extension is much more literally “in” the rough sensory idea of a drawn triangle – it is a (slightly) confused element of that sensory idea. Leibniz brought this point effectively to bear against part of Locke's attack on innatism. He also improved on Descartes's example of the statue by distinguishing the shapes arbitrarily in a block of marble and those that are preformed by the marble's veins (Leibniz 1981: 80).

Chomsky is sympathetic to very wide rationalist applications of innatism, but the sort of innate structure he requires in linguistics is represented in sophisticated, abstract

models of grammatical knowledge. This means that Chomsky's innatism is decidedly post-Leibnizian; the innate knowledge is implicit and not consciously available. As we have seen, the current scientific credentials of implicit innate knowledge have highlighted an old question. How can the tension be resolved that exists between Descartes's claim that thought is essentially conscious and the innatists' claim that innate ideas are usually implicit? The Innateness Hypothesis, as it has come to be known, has in fact been extended from knowledge of grammar to deeper and broader considerations in the philosophy of mind and psychology. A program advanced most prominently by Jerry Fodor (in Fodor 2000, for example) postulates an innate symbolic system that non-consciously underlies all the concepts expressed in natural languages. This language-of-thought strategy outstrips even Descartes's own in the sweeping scope and specificity of innate representative power that it postulates. Fodor's central argument is similar to what can be found in Descartes. For any representation to be interpreted, the concepts employed in the interpretation must already be in place. On pain of an infinite regress, a sufficient stock of concepts must be prior to sensory experience, that is, innate. An important difference, however, is that Descartes thought the ultimate stock of innate ideas to be very small. Fodor reads the experimental record as counting against such thoroughgoing compositionality. He therefore favors a huge stock of innate concepts.

Fodor has also argued that the classical philosophical opposition between rationalists and empiricists has been emptied of much life by the advance of science. Even classically, it is hard to make out a difference between an "implicit" innate idea and the ability to have an idea explicitly when properly conditioned by the senses. An empiricist might say that the rationalist's innate idea simply is what is learned from experience. But concerning the empiricist's "ability to have an explicit idea on the basis of experience," the rationalist can counter that this ability simply is what she calls an innate idea (2:130–3; AT 7:185–9). The current debate consequently tends away from traditional philosophical concerns and toward disagreements about the shape to be taken by the most successful empirical psychological theories. (For more on these less centrally philosophical considerations, see Fodor 2000 for the neo-rationalist point of view, Prinz 2002 for neo-empiricism, and Carruthers et. al. 2005 for a review of recent scientific literature.)

This chapter has argued that Descartes found it deeply explanatory to account for everything in thinking things as resulting from a small stock of innate ideas implanted by God at their creation. As in his physics, the device of a fabular history is a useful expository tool, as it permits an explanation to be built up from the ground without immediately having to confront complex phenomena. For Descartes, the explanatory story is a fable because he was committed to saying that God created the world with all the perfection we now find in it. From a contemporary scientific perspective the story is still more fabular because direct appeal to God's creation is not explanatory. In biological contexts, evolutionary theory is the replacement. We find Chomsky (1966: 59ff.), for example, arguing that the innate linguistic faculty must have evolved from non-linguistic ancestors. This explanatory strategy is, nevertheless, still fundamentally Cartesian. Many evolutionary explanations (such as Chomsky's) are forced to resort to "just so" stories – fables – in the absence of explicit evolutionary histories. This does not detract from the power of the theory under consideration.

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Chapter 20

Descartes on the Will in Judgment

LEX NEWMAN

On Descartes's account, the will is the central player in judgment, a role that this chapter aims to explain. The first section situates the will in Descartes's broader ontology of mind. The second section characterizes the will's contributions to judgment. The third section addresses the will's voluntary control over judgment. The fourth section considers whether, on Descartes's account, our epistemic responsibility in judgment is best understood as a form of compatibilism or incompatibilism.

Will in the Ontology of Mind

Descartes holds that the whole essence of mind is *thought*. On his view, "each substance has one principal property which constitutes its nature and essence, and to which all its other properties are referred"; he adds that "thought [*cogitatio*] constitutes the nature of thinking substance" (1:210; AT 8a:25). Of the word *thought*, Descartes writes: "I use this term to include everything that is within us in such a way that we are immediately aware of it" (2:113; AT 7:160). The mind's thoughts fall into two main sorts, as noted in *Principles* 1:32:

All the modes of thinking that we experience within ourselves can be brought under two general headings: perception, or the operation of the intellect, and volition, or the operation of the will. Sensory perception, imagination and pure understanding are simply various modes of perception; desire, aversion, assertion, denial and doubt are various modes of willing. (1:204; AT 8a:17)

This cognitive diversity is consistent with the doctrine that the essence of mind is simply thought, because "willing, understanding, imagining, and sensing and so on are just different ways of thinking" (3:56; AT 1:366).

Descartes characterizes the will as a *power* – an ability to do, to act: "the will simply consists in our ability to do or not do something (that is, to affirm or deny, to pursue or avoid)" (*Meditations* 4; 2:40; AT 7:57). In referring to the will as a *faculty* of the mind, Descartes does not mean to suggest discrete regions of mental infrastructure – the "soul has within it no diversity of parts" (*Passions* 47; 1:346; AT 11:364). Rather, as he

writes, “the term ‘faculty’ denotes nothing but a potentiality” (*Comments*; 1:305; AT 8b:361). When this power is exercised, that is, the potentiality is actualized, the resulting mental operations are *volitions*. Volitions constitute the mind’s actions – I return to this point below.

Volitions come in two main sorts: “one consists of the actions of the soul which terminate in the soul itself,” as, say, when we willingly attend to purely intellectual ideas; “the other consists of actions which terminate in our body, as when our merely willing to walk has the consequence that our legs move and we walk” (*Passions* 18; 1:335; AT 11:343). The latter sort sometimes results in conflicts with bodily causes. For though “the will is by its nature so free that it can never be constrained” (1:343; AT 11:359), its effects sometimes run up against opposing motions. Descartes holds that the bodily locus of mind-body interaction is the pineal gland, and it is here that such conflicts come to a head. The will may move the gland one way, while the activity of the nerves (animal spirits) pushes it another way – “the stronger cancelling the effect of the weaker” (*Passions* 47; 1:346; AT 11:365). Conflicts may also arise from the other sort of volition, in the form of competing inclinations in the will; for instance, contemplation of both supporting and undermining reasons relative to some proposition might give rise to opposing inclinations – one towards assent, another towards suspension (cf. *Meditations* 4; 2:41; AT 7:59).

Volitions directed at bodily movements bring to the fore the notorious causal interaction problem – namely, concerning how an immaterial mind causally interacts with a material brain. Descartes appears to think that the problem is not especially pressing; that mind-body interaction is merely a special case of causation understood in terms of God having ordained that one sort of item (causes) gives rise to another (effects). More generally, Descartes holds of all principles – whether those concerning mathematics, logic, mechanics, or mind-brain interactions – that they *are* true because God ordained that it should be so (cf. May 27, 1630 letter to Mersenne; 3:25; AT 1:151–3). This marks a quite significant difference between our wills and the divine will. “God did not will,” writes Descartes, “that the three angles of a triangle should be equal to two right angles because he recognized that it could not be otherwise”; rather, “it is because he willed . . . that the three angles of a triangle should necessarily equal two right angles that this is true and cannot be otherwise” (*Replies* 6; 2:291; AT 7:431–2).

Descartes characterizes volitions as the mind’s *actions*: “strictly speaking, understanding is the passivity of the mind and willing is its activity” (May 1641 letter to Regius; 3:182; AT 3:372). To better understand this, consider that in his view every thought is, at once, an action and a passion – a passion relative to the mind in which it occurs, an action relative to the actor/agent producing it:

I note that whatever takes place or occurs is generally called by philosophers a “passion” with regard to the subject to which it happens and an “action” with regard to that which makes it happen. Thus, although an agent and patient are often quite different, an action and passion must always be a single thing which has these two names on account of the two different subjects to which it may be related. (*Passions* 1; 1:328; AT 11:328)

To illustrate this, think of two adjacent dominoes, A and B, wherein the motion of A brings about a change in the motion in B. Relative to itself, B’s change of motion is a

passivity – something induced in it from without. Relative to A, B's change of motion is an activity – the action of A. Applying the distinction to the mind's thoughts introduces complication. For while changes in the motion of a domino are always the actions of something external to it, changes in a mind's thoughts are sometimes the actions of that same mind. Descartes reserves the term *volition* for those thoughts that are actions of that mind (cf. *Passions* 17, 21). So, though every thought can be properly conceived as a perception of the mind in which it occurs, not every thought can be properly regarded as a volition. Where thoughts are properly thus regarded, it is numerically the same thought that counts, in one regard, as an action of the mind, while counting, in another regard, as its passion – the choice in terms being somewhat fluid:

And although willing something is an action with respect to our soul, the perception of such willing may be said to be a passion in the soul. But because this perception is really one and the same thing as the volition, and names are always determined by whatever is most noble, we do not normally call it a "passion," but solely an "action." (*Passions* 19; 1:335–6; AT 11:343)

Note that we have been considering passions in the *general* sense (cf. *Passions* 17, 21, 25), whereby every thought can be properly regarded as a passion. Descartes also discusses a *specific* sense – a "more exact sense" – whereby passions are just those perceptions arising from the pineal gland (*Passions* 21, 27).

Importantly, references to *acts* are subject to ambiguity. In one sense an act is an *actuality*, the contrast case being an unactualized potentiality. In this sense Descartes sometimes refers to any occurrent thought – whether a perception or a volition – as an act or operation of the mind; for instance, he writes to Hobbes that "there are other acts which we call 'acts of thought' [*sunt deinde alii actus, quos vocamus cogitativos*], such as understanding, willing, imagining, having sensory perceptions, and so on" (2:124; AT 7:176). In another sense an act is an *action*, the contrast case being a passion. Hereafter, I reserve *act* talk for actualities – actual occurrences, be they actions or passions. I use the term *action* when referring to those actualities that are contrasted with the passions.

Will in Judgment

In judgment, the mind either affirms or denies something – either assents to it, or dissents from it. Descartes holds that it is one thing for the mind to be aware of a matter, that is, to perceive it; it is another thing to affirm or deny it. He ascribes these functions to different faculties of mind. Awareness is ascribed to the intellect; affirmation and denial are ascribed to the will. In Descartes's view, awareness aligns well with the passive side of the mind, and assent aligns better with its active side. As David Rosenthal argues, there are good reasons for grouping assent together with other exemplary cases that Descartes catalogues as operations of the will, including desiring and fearing (Rosenthal 1986: 411–16). Descartes holds that though judgment requires awareness, it consists in the affirmation or denial. Judgment is an act of will.

Relative to judgment, the mind adopts one of three stances toward the content of awareness – i.e., the will is broadly speaking in one of three doxastic states: *assent* to the matter, *dissent* from it, or a *suspension* of judgment. (For brevity, I typically refer simply to assent and suspension. I assume throughout that what is said about assent can be extended to dissent.) In the relevant sense, assent is not simply a speech act, nor any conventional gesture that might be expressed insincerely. As Bernard Williams writes of Descartes's view: "He is concerned with the question of whether I accept some proposition myself – in that sense of 'accept' in which the man who insincerely says 'I agree' does not accept the proposition. Assenting is what is done by one who thenceforth really believes the matter in question" (Williams 1978: 176)

To what sorts of perceptual content does the mind assent? According to Williams: "I can assent only to something of the nature of a proposition: one believes, or refuses to believe, *that such-and-such is the case*. Thus, if Descartes is to say that what we assent to are ideas, he must include propositional ideas. He must allow that there is an idea *that the angles of a triangle add up to two right angles*" (Williams 1978: 182). The texts allow for such a reading, for Descartes uses the term *idea* to cover all manner of perceptual content. As Jill Buroker notes: "the content of an idea can be very complex, and this complexity can be expressed propositionally. One famous example is Descartes's statement in the *Fifth Meditation* that understanding the idea of a right triangle entails recognizing that it has 'the properties which license the inference that its three angles equal no more than two right angles' [2:47; AT 7:68]" (Buroker 1996: 6). It is therefore no surprise that some texts imply that the objects of judgment are propositions (cf. 2:259; AT 7:376f., and 2:300; AT 7:445), while others imply that they are ideas (cf. 2:39; AT 7:56); these two characterizations need only be different ways of expressing the same point.

References to what is *affirmative* are potentially misleading. In one sense, affirmation is a property of propositions, as in affirmative statements predicating some quality of a subject. In another sense, affirmation is an action of the mind when it assents to a proposition. Judgment may involve both forms of affirmation. For instance, concerning the affirmative proposition *that I am sitting by the fire*, my will may affirm it. Alternatively, I may withhold assent. The method of doubt does indeed presuppose an ability to consider, hypothetically, various affirmative skeptical propositions without assenting to them. As Descartes explains: "what is thus imagined and attributed hypothetically is not thereby affirmed by the will as true, but is merely proposed for examination to the intellect" (1643 letter to Buitendijck; 3:230; AT 4:64).

Related is an ambiguity in *judgment* talk, arising from the tendency to use some mental operation words – *belief*, *perception*, *judgment*, and the like – to refer sometimes to the mental action, while other times to the objects of those actions. In speaking of beliefs, or perceptions, we sometimes mean to refer to the items believed, or perceived – e.g., in saying, "Among her beliefs is that our planetary system is heliocentric"; alternatively, we sometimes mean to refer to the mental actions of believing or perceiving – e.g., "The sincerity of her belief in the heliocentric view is not in doubt." It is the same with *judgment* talk. We may mean to refer to the proposition judged, or instead to the mental action of assenting/judging. Descartes generally employs the language of judgment to refer to acts of assent, but there are exceptions. For example, in some cases involving the recollection of past judgments he is clearly referring to

the propositions judged, not the past actions of judging (cf. *Meditations* 5; 2:48; AT 7:69–70).

Descartes characterizes proper judgment, in part, in terms of the intellect's perception, though ultimate responsibility is assigned to the will. Properly, the mind should give assent only when the intellect's perception is clear and distinct:

[If] I simply refrain from making a judgement in cases where I do not perceive the truth with sufficient clarity and distinctness, then it is clear that I am behaving correctly and avoiding error. But if in such cases I either affirm or deny, then I am not using my free will correctly. If I go for the alternative which is false, then obviously I shall be in error; if I take the other side, then it is by pure chance that I arrive at the truth, and I shall still be at fault. (*Meditations* 4; 2:41; AT 7:59–60)

Importantly, the content presented by the intellect (or the negation of that content) is what constitutes an "alternative which is false" (I return to this below). The point of the passage, however, is not to characterize truth and falsity, but to explain that we are at fault when we assent to propositions that are false – to wit, even when they are merely false for all we know. One of the broader aims of the Fourth Meditation is to advance a theodicy for error, showing that the blame for judgment error lies with us, not with God. (For more on the theodicy, see Newman 1999.) On Descartes's account, I am at fault not so much because of the state of my intellect, but because of what I do with my will:

I notice that they [judgment errors] depend on two concurrent causes, namely on the faculty of knowledge [*cognoscendi*] which is in me, and on the faculty of choice or freedom of the will; that is, they depend on both the intellect and the will simultaneously. Now all that the intellect does is to enable me to perceive the ideas which are subjects for possible judgments; and when regarded strictly in this light, it turns out to contain no error in the proper sense of that term.

...

So what then is the source of my mistakes? It must be simply this: the scope of the will is wider than that of the intellect; but instead of restricting it within the same limits, I extend its use to matters which I do not understand. (*Meditations* 4; 2:39f.; AT 7:56–8)

The passage adds: "in this incorrect use of free will may be found the privation which constitutes the essence of error" (2:41; AT 7:60). This identification of judgment error with the activity of a free will accords with Descartes's more general understanding of responsibility:

I see only one thing in us which could give us good reason for esteeming ourselves, namely, the exercise of our free will and the control we have over our volitions. For we can reasonably be praised or blamed only for actions that depend upon this free will. (*Passions* 152; 1:384; AT 11:445)

Descartes holds that the very possibility of judgment error stems from a scope disparity between the intellect and the will:

[T]he perception of the intellect extends only to the few objects presented to it, and is always extremely limited. The will, on the other hand, can in a certain sense be called infinite, since we observe without exception that its scope extends to anything that can possibly be an object of any other will – even the immeasurable will of God. So it is easy for us to extend our will beyond what we clearly perceive; and when we do this it is no wonder that we may happen to go wrong. (*Principles* 1:35; 1:204–5; AT 8a:18)

I take this reference to the will's infinity, along with the comparison with the divine will, to refer only to the will's scope, not its nature. The point of the passage is to clarify not that our wills possess unlimited power – as if comparable to the divine will in this regard – but that we're able to assent to more propositions than we're able to clearly perceive. Limitation in our intellects explains the possibility of judgment error; misuse of our free will explains its actuality.

Note that Descartes applies this account of proper judgment only in contexts of rigorous inquiry, not practical action (cf. *Meditations* 1; 2:15; AT 7:22). As a practical matter, not only is acting on dubious sense perception necessary to our survival, Descartes holds that such perception is, for all practical purposes, "sufficiently clear and distinct" (*Meditations* 6; 2:57; AT 7:83).

Readers of Descartes have found various aspects of the foregoing account troubling. I want to consider three such concerns. One troubling aspect concerns his remarks about the nature of truth and falsity. Early in the Third Meditation, while inquiring as to which thoughts "can properly be said to be the bearers of truth and falsity," Descartes writes that ideas "cannot strictly speaking be false" (2:25–6; AT 7:36–7); adding, in a follow-up passage, that "falsity in the strict sense, or formal falsity, can occur only in judgements" (2:30; AT 7:43). On a *prima facie* reading, these passages are in tension with parts of the account as I have characterized it. The suggestion is that truth and falsity are, strictly speaking, properties not of the propositional contents perceived by the intellect, but of the will's acts of assent. Margaret Wilson contends that Descartes "tends to run together the notions of *falsity* and *error*" (Wilson 1978: 141) – a charge that surely has merit. She contends further that some such conflation contributes to the mistake of locating falsity in judgment, rather than error, adding that Descartes should allow that the contents perceived by the intellect "*are* true or false independently of our affirmations or denials"; what "Descartes should say" is that "the ideas 'perceived by the understanding' may be (true or) false, but error arises not in the 'perception,' but in the affirmation" (*ibid.*).

My own sense is that what Wilson says Descartes *should* say, is what *in fact* he holds. Indeed, the *prima facie* reading of the problematic Third Meditation remarks conflicts with countless other clear passages. For example, clear statements in the Fourth Meditation – the locus classicus for doctrines pertaining to judgment – imply that the contents perceived by the intellect have truth value independent of the will's assent. We read there that we're to "refrain from making a judgement in cases where [we] do not perceive the truth with sufficient clarity and distinctness" (2:41; AT 7:59f.), implying that the intellect's perceptual content has independent truth value. The passage continues: "If I go for the alternative which is false, then obviously I shall be in error; if I take the other side, then it is by pure chance that I arrive at the truth" (*ibid.*) – claims which likewise imply a truth value of the alternatives perceived in the intellect. Consider also the implication of various texts concerning the so-called eternal truths. These are

“propositions which are eternally true” (*Principles* 1:75; 1:221; AT 8a:38), a status they enjoy even when contemplated without assent in minds “blinded by preconceived opinions” (*Principles* 1:49f.; 1:209; AT 8a:24). Finally, consider what Descartes writes to Mersenne concerning truth: “the word ‘truth,’ in the strict sense, denotes the conformity of thought with its object” (October 16, 1639 letter; 3:139; AT 2:597). On the most natural reading of this, what stands in such relations of *conformity* are contents represented in the intellect, not the actions of the will. Such passages make no sense if, as Wilson supposes, Descartes denies that the contents perceived by the intellect have truth value “independently of our affirmations or denials.”

How then are we to interpret the two problematic Third Meditation passages about formal falsity? No consensus interpretation has emerged, but let me offer one line of suggestion. In the first passage, what Descartes actually writes is not that ideas – without qualification – cannot be bearers of truth and falsity, but that “provided they [ideas] are considered solely in themselves and I do not refer them to anything else, they cannot strictly speaking be false” (2:26; AT 7:37). Given the qualification – ideas “considered solely in themselves” – the remark need not mean that *all* ideas lack truth value, but only non-relational ideas; this is the right result, assuming that truth value belongs only to ideas with propositional structure. This tack doesn’t help with the second passage, however, for in stating that “falsity in the strict sense, or formal falsity, can occur only in judgements” (2:30; AT 7:43), that passage appears to rule out that non-judged propositional contents could be strictly false. Before drawing such a conclusion, recall that we earlier noted an ambiguity arising in *judgment* talk. Accordingly, when referring to judgments we sometimes mean to refer to mental acts of judging, while at other times to the propositions judged. If in saying that falsity “can occur only in judgements” Descartes means the propositions judged, the remark is innocuous. Though this is not Descartes’s usual way of using *judgment* talk, he does sometimes use it in this way, and the context of the Third Meditation remark will tolerate such a reading. The broader issues are very complex, and there are more texts to reconcile than just these two Third Meditation passages. Whatever is their correct interpretation, we should be cautious about interpreting them in a way that conflicts with so many other clear passages indicating that the perceptual contents considered by the intellect can indeed have truth value.

A second aspect of Descartes’s account of judgment that has troubled some readers concerns whether he can countenance *degrees* of belief. It’s indisputable that some beliefs are held more strongly than others. Yet Descartes’s account seems to have it that the will either fully assents (or dissents), or fully withholds assent – never partially assenting, with respect to a specific bit of content. Edwin Curley thus objects that in taking assent to be “an all or nothing action” Descartes is insensitive to there being degrees of belief (Curley 1975: 166). By way of reply, there are multiple ways of understanding degrees of belief. Though some accounts are problematic for Descartes, his critics would need to show that no plausible account is open to him. One sort of account friendly to him locates the variations of degree in the perceptual *grounds* of assent, rather than in the *action* of assent, *per se*. To illustrate this, contrast the cases of assent to a clearly and distinctly perceived proposition, and of assent to a confusedly perceived proposition. In the former case, the ground of assent makes the proposition evident to

a *greater degree* than in the latter case, but we can understand both cases to involve full-fledged assent in the will. Likewise, though the gambler may make wagers with varying degrees of confidence, thus betting different amounts of money, she makes full-fledged bets in each case. This understanding of degrees of belief makes good sense of the intuition that our beliefs are held with varying degrees of conviction, and it is fully consistent with Descartes's account.

The third contested aspect of Descartes's account that I want to consider concerns his conception of assent as an operation of the will rather than of the intellect. Articulating an influential objection, Curley asks: "If my intellect affirms that the sun is very large, am *I* not already judging that it is? Is it really necessary for my will to add its concurring 'opinion'?" (Curley 1975: 174). In defense of Descartes, the very issue in dispute is *whether* the intellect is properly conceived as *affirming* propositional contents, as opposed merely to being aware of them. Assent is always given *to* some propositional content perceived. Descartes maintains a division of labor whereby the perception is the job of the intellect, while the assent is a further job performed by the will. As Curley conceives the labor, there's just a single job. The perception of the proposition is the assent to it, leaving no further work to be done. Curley contends that "conceptual analysis" reveals that when, say, the mind suspends judgment on the basis of considering evenly balanced pro and con arguments, the action of withholding the assent is not "a *consequence* of finding the arguments pro and con are pretty evenly balanced. It is simply the state itself of finding them to be so" (Curley 1975: 175; emphasis added). Why, then, does Descartes distinguish two tasks? In the *Comments on a Certain Broadsheet*, he explains:

I saw that over and above perception, which is a prerequisite of judgement, we need affirmation and negation to determine the form of the judgement, and also that we are often free to withhold our assent, even if we perceive the matter in question. Hence I assigned the act of judging itself, which consists simply in assenting (i.e., in affirmation or denial) to the determination of the will rather than to the perception of the intellect. (1:307; AT 8b:363)

Descartes here concludes that the assent to a proposition is "over and above" the perception of it, because such perception may on one occasion result in assent, while on another resulting in suspension. If, as Curley contends, to perceive *p* just *is* to assent to *p*, then there *could* be no circumstances under which we perceive *p* without assenting to it. I take Descartes's remark that "we are often free to withhold our assent" to be an allusion to the method of doubt. For instance, as I look at the tower in the distance today, it may appear in my perception to be rounded at the edges, just as it appeared yesterday; yet, unlike yesterday, I may withhold assent today, by employing skeptical doubts. Descartes thinks such examples show that numerically the same propositional content – say, *that the shape of the tower is as it appears* – may be attended by different doxastic states. It follows, as he writes, that assent is something "over and above perception."

In defense of Curley, one might contend that the situation is different with clear and distinct perception. Descartes writes that "our mind is of such a nature that it cannot

help assenting to what it clearly understands" (3:147; AT 3:64–5). As Alan Nelson explains: "A clear and distinct perception is *invariably* accompanied by the assent of the will. It is, moreover, part of the 'nature' of the will that this happen" (Nelson 1997: 1963). In view of this doctrine, one might argue that in clear and distinct cases the work of assent is fully encompassed in the perception. Wilson makes such an argument:

[I]f "clearly and distinctly perceiving p" is taken to mean or imply, "perceiving that p is true," all the work of assent is already ascribed to the understanding – there is no room, logically, for an act of will. (Wilson 1978: 145; cf. Williams 1978: 183)

But here we must ask, what is it to perceive *that* a proposition is true? In what does such perception consist? "Perceiving *that* p is true" cannot simply mean that "in one's perception p is represented as being true"; nor does it help to add that it is "represented as being *certainly* true." Descartes persuasively argues that prior to contemplating the method of doubt it may seem to us that we believe many propositions "about which doubt is quite impossible" – "for example, that I am here, sitting by the fire," and so on (*Meditations* 1; 2:12f.; AT 7:18). Though in our perception, such propositions are represented as being certainly true, we learn how to use doubt to withhold assent from them even while perceiving them. What, then, *does* "perceive *that*" talk mean? For cases in which we feel extra certainty, such talk is perhaps a fitting bit of verbal embellishment helping to convey the great strength of psychological conviction. But this is hardly relevant to the metaphysical question of whether assent is something "over and above perception." Perhaps "perceive *that*" talk just means this: that in addition to the proposition being represented as true in one's perception of it, the mind has taken the further mental step of *affirming that* it is true. In that case, *perception* talk is – in this special case – being used for both (a) the awareness of the proposition as seeming to be true, and (b) the affirmation that the proposition is true. If this is what "perceiving *that* p is true" comes to, then it hardly follows that Descartes is wrong to distinguish (a) and (b). The upshot is rather that perception talk is being used with much wider scope than Descartes allows. Given *his* usage, perception talk is narrowly circumscribed to include only the awareness, but not the actual judgment: "all that the intellect does is to enable me to perceive the ideas which are subjects for possible judgements" (*Meditations* 4; 2:39; AT 7:56). He maintains that when the perception is clear and distinct the assent is compulsory, but from this it does not logically follow that the perception and the assent are identical. One begins to suspect that the Curley and Wilson line of objection amounts to more of a semantic disagreement with Descartes than a real disagreement. As an alternative to "perceive *that*" talk, Paul Hoffman helpfully suggests the kind of language we should use in connection with Descartes's account:

Instead of saying, for example, that I clearly and distinctly perceive that a triangle has three angles, we should say that I have a clear and distinct perception of a triangle having three angles or that I clearly and distinctly perceive a triangle as having three angles. We might also say that I clearly and distinctly perceive the proposition that a triangle has three angles as true. (Hoffman 2003: 263)

Will and Voluntary Control of Judgment

Descartes maintains that “we have free will, enabling us to withhold our assent in doubtful matters and hence avoid error” (1:194; AT 8a:6). His view, as we’ve seen, is that the will’s voluntary control over assent is essential to epistemic responsibility; and more generally that “the exercise of our free will and the control we have over our volitions” is what makes it possible that “we can reasonably be praised or blamed” (*Passions* 152; 1:384; AT 11:445). The *Meditations* program of methodic doubt involves careful exercise of this voluntary power over the will; indeed it involves, as the meditator remarks, a “plan to turn my will in completely the opposite direction,” thereby withholding assent from my former opinions (2:15; AT 7:22). The aim of the present section is to clarify how Descartes understands the manner of this voluntary control.

Two main kinds of accounts are plausibly attributed to Descartes. The one account ascribes to the will a power of *direct* voluntary control over its doxastic states – i.e., states of assent, dissent, and suspension. Control is direct in that voluntary effort is directed straightaway at the doxastic state, not at something else. The mind has the power straightforwardly to will itself to believe propositions. The competing model of voluntary doxastic control denies such direct control, maintaining that the will’s control is *indirect*. In what sense indirect? Descartes characterizes such indirect control for the case of the passions:

Our passions, too, cannot be directly aroused or suppressed by the action of our will, but only indirectly through the representation of things which are usually joined with the passions we wish to have and opposed to the passions we wish to reject. For example, in order to arouse boldness and suppress fear in ourselves, it is not sufficient to have the volition to do so. We must apply ourselves to consider the reasons, objects, or precedents which persuade us that the danger is not great; that there is always more security in defence than in flight; that we shall gain glory and joy if we conquer, whereas we can expect nothing but regret and shame if we flee; and so on. (*Passions* 45; 1:345; AT 11:362–3)

Extending this model of indirect control to the case of judgment: our assent cannot be directly aroused or suppressed by the action of our will, but only indirectly through the representation of things which are usually joined with the desired doxastic state – namely, via the representation of *reasons for belief* (broadly construed): *assent* to a proposition is determined by perceptual attention to supporting reasons; *dissent* is determined by attention to refuting reasons; *suspension*, or doubt, is determined by attention to undermining reasons.

On the usual terminology, the former kind of position – direct doxastic control – is called *voluntarism*, but not the latter. That terminology is misleading insofar as non-voluntarist options also allow for voluntary control, albeit indirect. The debate of present interest is not about whether Descartes thinks we have voluntary doxastic control, but instead about whether he thinks such voluntary control is direct, or instead indirect. I shall therefore adopt different terminology, referring to the account of direct control as Direct Voluntarism, and to the account of indirect control as Indirect

Voluntarism. As will emerge, though a strong case can be made on behalf of either interpretation, I favor an Indirect Voluntarism reading.

Direct Voluntarism interpretations find some support in the Fourth Meditation account of judgment. According to that account, we have an epistemic duty to “simply refrain from making a judgement in cases where [we] do not perceive the truth with sufficient clarity and distinctness” (2:41; AT 7:59). This seems to suggest that – simply by trying – we can control our assent. As Janet Broughton observes, Descartes “resolves to suspend judgment about everything he fails to grasp clearly and distinctly, and he describes the obstacle to this course of action as being the difficulty of remembering this resolution, not some inability to carry it out while trying” (Broughton 2002: 58). Of such cases in which we lack clear and distinct perception, Descartes adds that we have “the freedom to assent or not to assent” (2:42; AT 7:61), a remark that Michael Della Rocca thinks “most naturally suggests” a power of “direct control” over assent (Della Rocca 2006: 148).

The Direct Voluntarism interpreter might take the method of doubt to provide further support. While explaining the method, Descartes has his meditator say, of his past opinions: “I must withhold my assent from these former beliefs just as carefully as I would from obvious falsehoods, if I want to discover any certainty”; and he adds, “I think it will be a good plan to turn my will in completely the opposite direction and deceive myself” (*Meditations* 1; 2:15; AT 7:21–2). These remarks can be read as suggesting an ability for direct control of assent. As Broughton sums up the First Meditation attitude: “it is here and now within my power to suspend judgment about the truth of anything I have believed” (Broughton 2002: 58).

Interestingly, Indirect Voluntarism interpreters can, likewise, cite both the method of doubt, as well as the Fourth Meditation account, in support of their interpretation. For instance, consider the manner in which methodic doubt unfolds. The opening two paragraphs of the First Meditation offer a general rationale for methodic doubt. If Descartes means to be assuming direct voluntary control of assent, why doesn’t he have his meditator straightaway withhold assent from all of his previous opinions – what is the point in enumerating specific reasons for doubt? What the enumeration of reasons for doubt suggests is that Descartes means to be invoking indirect voluntary control over assent. As Della Rocca writes, Descartes “makes it quite clear in Meditation 1 that the suspense of belief comes about after consideration of *reasons* for doubt and not by a simple mental fiat” (Della Rocca 2006: 149). To take just one example, early in the First Meditation Descartes clarifies the sort of sense-based beliefs about which we’re enjoined to suspend judgment: “that I am here, sitting by the fire, wearing a winter dressing-gown, holding this piece of paper in my hands” (2:13; AT 7:18). Rather than having us suspend judgment *simply by trying*, Descartes shows how to doubt such propositions by attending to reasons for doubt: I’m to attend to the dreaming doubt, thereby wondering whether I’m *really* “holding this piece of paper in my hands,” or merely dreaming that I am. And note that it’s the same for every proposition about which we’re to suspend judgment. Indeed, as for the meditator’s remark that “it will be a good plan to turn [his] will in completely the opposite direction,” he immediately invokes reasons for doubt: “I will suppose therefore . . . some malicious demon” (2:15; AT 7:22).

Does Descartes regard reflection on reasons for doubt as optional, or instead as integral to carrying out his method? What he writes in the Appendix to the Fifth Replies indicates that the undermining reasons are needed in order actually to determine the will to doubt:

I did say that there was some difficulty in expelling from our belief everything we have previously accepted. One reason for this is that before we can decide [*déterminer*] to doubt, we need [*besoin*] some reason for doubting; and that is why in my First Meditation I put forward the principal reasons for doubt. (2:270; AT 9a:204)

Note too that this understanding of the role of doubt suggests a way to understand the Fourth Meditation account of our epistemic duty to withhold assent unless our perception is clear and distinct: namely, that the duty to withhold assent is a duty to attend to reasons for doubt.

Importantly, there are simplistic objections to which neither kind of interpretation need succumb. Direct Voluntarism accounts need not entail the phenomenally implausible view that *every* doxastic state is directly determined by an act of will. Indeed, the most common variant of Direct Voluntarism interpretations effectively underscore, as Descartes writes in *Principles* 1:39, “that we have power in *many* cases to give or withhold our assent at will” (1:205; AT 8a:19; emphasis added). The qualification is important because of the doctrine that assent is non-optional when the intellect’s perception is clear and distinct. Williams, himself among the direct voluntarist interpreters, explains two related restrictions on the account:

The restrictions are, first, that the will is not invoked against what the thinker regards, and continues to regard, as overwhelming reasons for a certain belief, and, second, that its most important use lies in its being invoked negatively, that is to say, in connection with the suspension of belief. (Williams 1978: 178)

As such, the principal circumstance in which the will exercises its power of direct control over assent occurs when the mind is *indifferent* as to whether to give or to withhold assent. A parallel sort of objection aimed at the other interpretive camp is no more persuasive. Indirect Voluntarism accounts need not entail the phenomenally implausible view that *every* doxastic state is indirectly determined by the will. Such accounts do require that every doxastic state is determined by the intellect, but they can allow that the intellect’s perception often arises from the senses rather than from the will.

We have considered only a small sample of the texts and considerations that might be cited on behalf of either interpretation. I have focused on considerations related to the method of doubt, and the theory of judgment, since they are often taken to support a Direct Voluntarism interpretation – a conclusion which, as I’ve tried to show, is by no means clear. In addition to citing textual considerations, interpreters sometimes ask – in the name of charity – what kind of account a smart philosopher like Descartes *should* hold. In connection with this, it is widely held that our doxastic states are not subject to direct voluntary control. Williams argues that “it is far from clear how assenting is even dependent on the will, let alone a mode of it,” for voluntariness seems to be

neither necessary nor sufficient for belief: “are there not a very large number of things that one just cannot believe, and others that one cannot help believing?” (Williams 1978: 176). Wilson adds that “of course we can’t just decide to believe or assent to something, and forthwith believe or assent to it” (p. 145). In the same vein, Curley suggests an introspective psychological experiment to reveal that Direct Voluntarism is a mistaken philosophical theory:

Consider some proposition for which you have literally no evidence at all one way or the other. It may not be as easy as you might suppose to think of an example which strictly satisfies that condition, but I am in this situation with respect to the proposition “it rained three hours ago on Jupiter.” Now, paying careful attention to what is happening in your mind, believe it. Or, if you prefer, disbelieve it. Or do both, in turn. Did anything happen? Unless your experience is very unlike mine, I suspect not. Indeed, I fear that if my salvation depended on my either believing or disbelieving this particular proposition, I should be damned. (Curley 1975: 178)

It is difficult to disagree with Curley’s assessment. It is no wonder, then, that Williams, Wilson, and Curley each criticize Descartes’s theory of judgment as ill-conceived, for each attributes to him a version of Direct Voluntarism. Unfortunately, none of them makes a case for such an interpretation.

I suggest that the apparent implausibility of Direct Voluntarism should – other things being equal – motivate more aggressive efforts at an Indirect Voluntarism interpretation. An Indirect Voluntarism interpretation has received *some* attention in the literature (cf. Kenny 1972; Cottingham 2002, 1988; Della Rocca 2006), though not the systematic defense that in my judgment it deserves.

Will, Judgment, and the Compatibilism Debate

Philosophers have long debated two main kinds of accounts of the liberty requisite to assigning praise and blame for actions. Our interest is with a special case of that debate applying to epistemic actions – namely, the actions of giving and suspending assent. The one kind of account is called *compatibilist*, because such accounts allow that our bearing responsibility for our actions is compatible with such actions having been predetermined. The other sort of account is called *incompatibilist*, because such accounts maintain to the contrary that our bearing responsibility for our actions is not compatible with their having been predetermined. The aim of the present section is to try to establish whether Descartes’s account of our epistemic responsibility in judgment is best understood as compatibilist or incompatibilist. (The debate is often framed in terms of a fully general determinism. For our purposes, however, it will suffice to consider a more limited determinism whereby *every element in the judgment forming process* is predetermined by prior circumstances. This limited thesis is what I hereafter refer to, in speaking about determinism.)

The central problem in the interpretation of Descartes’s position arises from an apparent tension in his views. Compatibilist interpretations cite texts and doctrines seeming to commit him either to determinism, or to it being the case that we bear

epistemic responsibility even in circumstances that are deterministic. Consider first the latter. Compatibilist interpreters often cite the doctrine already discussed, whereby clear and distinct perception determines the will's assent. In at least these cases, goes the reasoning, the will's assent arises from deterministic circumstances. And importantly, these are paradigm cases of proper judgment. If in these paradigm cases the will's assent is determined, then Descartes's account is compatibilist. This reasoning seems further reinforced by such Fourth Meditation claims as the following:

In order to be free, there is no need for me to be inclined both ways; on the contrary, the more I incline in one direction – either because I clearly understand that reasons of truth and goodness point that way, or because of a divinely produced disposition of my inmost thoughts – the freer is my choice. (2:40; AT 7:57–8)

The apparent point of this passage is that the fact that clear and distinct perception determines the will's assent is compatible with our enjoying freedom over the resulting judgments; indeed, that we're *freer* in those cases.

Other considerations suggest the stronger view that Descartes is indeed a determinist. One way into such a view is via issues of divine sovereignty and preordination. If all things – including the wills of creatures – are dependent on the divine will, the apparent conclusion is that our every volition is subject to divine preordination and control. And since Descartes affirms an especially strong thesis of divine sovereignty, it would seem therefore that he is a determinist.

Such considerations as these make a powerful case for a compatibilist interpretation. Vere Chappell sums up the case: Descartes holds “that volitions are caused by God,” as well as “by clear perceptions,” all the while “remaining committed to the freedom of every volition”; consequently, “it *follows* that Descartes is a compatibilist with respect to each of these relationships” (Chappell 1994: 188).

On the other side of the debate, incompatibilist interpretations cite their own supporting texts and doctrines. Among the distinctly incompatibilist libertarian doctrines is the notion of freedom of alternate possibility. Accordingly, one is free only if one can choose among two or more contrary alternatives, each of which is genuinely open – i.e., none of which has been predetermined by the past. By contrast, determinist accounts have it that only one of the “alternatives” is genuinely open, itself being an unavoidable consequence of the past; determinist accounts are thus often characterized as implying that the agent *could not do otherwise* given the past history of the world. Various texts seem to tie Descartes's account of epistemic responsibility to the notion of freedom of alternate possibility. In *Principles* 1:37, while clarifying what makes a person “deserve praise or blame,” he writes:

The extremely broad scope of the will is part of its very nature. And it is a supreme perfection in man that he acts voluntarily, that is, freely; this makes him in a special way the author of his actions and deserving of praise for what he does. We do not praise automata for accurately producing all the movements they were designed to perform, because the production of these movements *occurs necessarily*. It is the designer who is praised for constructing such carefully made devices; for in constructing them he acted *not out of necessity but freely*. By the same principle, when we embrace the truth, our doing so voluntarily is much more to our credit than would be the case if we *could not do otherwise*. (1:205; AT 8a:18f.; emphasis added)

That Descartes distinguishes our free, praiseworthy behavior and the necessitated behavior of an automaton is significant. His argument is not that automatist behavior fails to be praiseworthy because of the absence of a mind; that would miss the essential point, for we can conceive of minds the thoughts of which unfold deterministically. Rather, the argument is that the automatist behavior is not praiseworthy because it “occurs necessarily” – because of unfolding deterministically, on the present reading of the passage. Freedom of alternate possibility is taken as a necessary condition of responsibility. Descartes’s 1644–5 letters to Mesland convey the same. He characterizes the will’s power of self-determination in terms of “a real and positive power to determine oneself” (3:234; AT 4:116); in a follow-up letter he links the account with alternate possibility, noting that the will’s positive power is “a positive faculty of determining oneself to one or other of two contraries” (3:245; AT 4:173).

We have, therefore, two kinds of passages seeming to be in tension – some passages suggesting compatibilism, others suggesting incompatibilism. As Lilli Alanen asks:

How can he [Descartes] claim both that the will is determined by the good clearly perceived and yet has a “real and positive power to determine itself” independently of the perceptions of the intellect? (Alanen 2003: 232)

How are we to reconcile the two sets of texts?

The apparent tension has suggested to some readers a mixed interpretation whereby Descartes changes his view. According to Tad Schmaltz, the account of the *Principles* (published in 1644) “requires indifference and lack of determination,” which “seems clearly to be at odds with the view of the 1641 *Meditations*” (Schmaltz 1994: 7–8). Schmaltz cites the *Principles* 1:37 passage (quoted above) as marking a telling difference between the 1641 and 1644 accounts. He concludes that the *Principles* marks “a sincere attempt on Descartes’s part to modify his account of human freedom in Meditation IV” (p. 13). Michelle Beyssade offers a slightly different line of argument for the change-of-view thesis, pointing to a significant change from the original Latin text of the *Meditations* to the 1647 French edition. (Descartes is known to have approved the translation, though the details of his approval are unknown.) Beyssade explains:

[W]hat Descartes regards, in the Latin text, as not necessary for human freedom, i.e., as not constitutive of the essence of freedom, is the power of choosing between two contraries. . . .

By contrast, what Descartes, in the French text, regards as not necessary for human freedom, that is as not constitutive of its essence, what he dissociates from freedom, is *the state of indifference or wavering or balance* due to ignorance. (Beyssade 1994: 194)

In her view, the Latin text explicitly rejects that the freedom of alternate possibility is needed for epistemic responsibility, whereas the French text backs off of that rejection, using language that is neutral as to such freedom.

Opponents of the change-of-view thesis are not without resources. One strategy for replying to Schmaltz involves showing either that the cited 1641 doctrines continue to be held in 1644, or that the cited 1644 doctrines were already held in 1641 – a

strategy that looks promising. For example, the 1641 doctrine whereby clear and distinct perception compels assent is articulated in the 1644 *Principles* (cf. article 43); and it's suggestive that Descartes's 1644 references to deterministic behavior in automata are, at least in part, continuous with his earliest published writings. (It should be said that these factors are not unnoticed by Schmaltz, and he discusses them.) As for Beyssade's line of argument, her opponents will surely emphasize that her thesis depends on what even she concedes is a disputed translation of the Latin (Beyssade 1994: 194).

Currently, a compatibilist interpretation is the dominant view in the literature. My own judgment is that the recent literature has not given due attention to the considerations in support of an incompatibilist interpretation. (C. P. Ragland's work is a notable exception; cf. Ragland 2006.) In what remains of this chapter, I sketch some main lines of defense of such an interpretation.

We've noted two main lines of support for a compatibilist interpretation – one concerning the seemingly deterministic character of proper judgment, and the other concerning divine sovereignty. Let's reconsider each.

The doctrine whereby clear and distinct perception compels assent need not be understood in compatibilist terms. In his exchange with Mesland, Descartes indicates that the exercise of free will extends even to such cases:

For it is always open to us to hold back from pursuing a clearly known good, or from admitting a clearly perceived truth, provided we consider it a good thing to demonstrate the freedom of our will by so doing. (3:245; AT 4:173)

As numerous commentators have argued (cf. Kenny 1972: 29; Schmaltz 1994: 11; Hoffman 2003: 266), this remark can be interpreted in connection with an earlier letter, in which Descartes refers to our ability to help control the intellect's attention. By diverting our attention away from what is clear and distinct, we can thereby "hold back," and thus "demonstrate the freedom of our will." Nothing in the 1641 *Meditations* texts conflicts with this understanding. To the contrary, Descartes is clear that assent-compulsion only accompanies *occurrent* clarity and distinctness (*Meditations* 3; 2:25; AT 7:36; and *Meditations* 5; 2:48; AT 7:69f.) and that such perception is easily diverted, it being in our nature to have difficulty sustaining attention (cf. *Meditations* 4; 2:43; AT 7:62; and *Meditations* 5; 2:48; AT 7:69). As noted above, in connection with an Indirect Voluntarism interpretation, we enjoy some degree of voluntary input over our attention. On the kind of incompatibilist interpretation I would propose, the will's freedom of alternate possibility arises in connection with this power to help direct attention, not with a power of direct control over assent. This interpretation nicely resolves the claimed tension in holding both that clear and distinct perception determines assent *and* that epistemic responsibility depends on the freedom of alternate possibility: the will's doxastic states *are* determined by the intellect's perceptual states, but the will's epistemic praiseworthiness and blameworthiness derive from its ability to help control the intellect's perceptual attention.

Other problematic issues for an incompatibilist interpretation can be explained as well. Recall the Fourth Meditation remark that "there is no need for me to be inclined both ways"; that "the more I incline in one direction . . . the freer is my choice." Though

such remarks might seem to imply a compatibilist account, Descartes's own explanation of the remarks suggests otherwise. In a letter to Mesland, Descartes writes that the notion of freedom to which he was referring "consists simply in ease of operation," adding:

It was in this sense that I wrote that I moved towards something all the more freely when there were more reasons driving me towards it; for it is certain that in that case our will moves itself with greater facility and force [*majori tunc cum facilitate atque impetu se movere*]. (3:246; AT 4:174ff.)

In what sense a "greater facility"? I suggest the following answer. When our perceptual attention encompasses opposing reasons – pro reasons, along with reasons for doubt – there's an intellectual tug of war, of sorts, the will being pulled in opposing directions. The pro reasons "may pull me in one direction," while attention to reasons for doubt may "push my assent the other way" (2:41; AT 7:59). Such cases do not avail the will of the same straightforward ease of control over its doxastic states as occurs when it directs perceptual attention straightaway to clearly and distinctly perceived ideas. Either way, we bear the same responsibility, and either way the will enjoys the power of positive freedom, though the will's control over its doxastic states doesn't admit of equal agility. It is in this sense that I'm *freer* insofar as there are "more reasons driving me towards" assent, than in cases where there are fewer such reasons; and I'm *freest* when I perceive none but compelling reasons – i.e., when I'm in no way indifferent. As Descartes adds to Mesland: "If we follow the course which appears to have the most reasons in its favour, we determine ourselves more easily" (3:245; AT 4:174). Thus understood, the *prima facie* problematic remarks comport well with an incompatibilist interpretation.

Neither does the appeal to divine sovereignty make a compelling case. The argument, recall, has it that the fact that everything – including our volitions – is dependent on the divine will implies that Descartes is a determinist. Note, however, that though Descartes concedes that our free will is "not incompatible" with such dependence on God, he characterizes it as "a dependence of quite another kind" (November 3, 1645 letter to Princess Elizabeth; 3:277; AT 4:333). In the case of the eternal truths, which, on his view, do also depend on the divine will, Descartes's understanding is that such truths count as necessary *because* God willed it to be so. Descartes can likewise maintain that creatures have wills that are independent of divine determination because God willed it to be so. This is quite paradoxical – to *our* minds, at any rate. But as Descartes writes to Mersenne: "In general we can assert that God can do everything that is within our grasp but not that he cannot do what is beyond our grasp. It would be rash to think that our imagination reaches as far as his power" (3:23; AT 1:146). What is important, for our purposes, is that – in the face of issues of divine preordination – Descartes shows no more inclination to abandon an incompatibilist conception of the will, than to give up the necessity of the eternal truths (cf. Ragland 2006). In the final analysis (of which our minds are capable), there are mysteries that we cannot fully resolve. In the same *Principles* passage in which he contrasts our praiseworthy behavior with the necessitated behavior of an automaton, Descartes explains "how to reconcile the freedom of our will with divine preordination":

But we shall get out of these difficulties if we remember that our mind is finite, while the power of God is infinite – the power by which he not only knew from eternity whatever is or can be, but also willed it and preordained it. We may attain sufficient knowledge of this power to perceive clearly and distinctly that God possesses it; but we cannot get a sufficient grasp of it *to see how it leaves the free actions of men undetermined*. Nonetheless, we have such close awareness of the freedom and indifference which is in us, that there is nothing we can grasp more evidently or more perfectly. And it would be absurd, simply because we do not grasp one thing, which we know must by its very nature be beyond our comprehension, to doubt something else of which we have an intimate grasp and which we experience within ourselves. (*Principles* 1:41; 1:206; AT 8a:20; emphasis added)

Descartes is clear that the central problem arising from divine preordination stems from our inability “to see how it leaves the free actions of men undetermined.” And this brings to the fore a point worth emphasizing. The very fact that Descartes struggles to square his conception of our epistemic responsibility with divine preordination constitutes powerful evidence that his is a fundamentally incompatibilist conception of responsibility – that *his* conception “leaves the free actions of men undetermined.” For on a compatibilist conception, whereby the free actions of men are *determined*, there is no difficulty in reconciling it with divine preordination.

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Chapter 21

Omnipotence, Modality, and Conceivability

LILLI ALANEN

This chapter discusses Descartes's doctrine of the creation of eternal truths and its interpretation. Descartes's statements of the original thesis that the eternal truths are freely established by God are sparse and disconnected, and it is not quite clear what view of modality Descartes commits himself to, or whether, indeed, he had a consistent view on the nature and foundation of necessary and possible truths. Two general lines of interpretation have prevailed. According to the first, Descartes holds that there is no absolute necessity or modality – there is only necessity for us, spelled out by commentators as conceptual or epistemic modality. (Versions of this reading can be found in Marion 1980; Plantinga 1980; Bouveresse 1983; it has also, mistakenly, been attributed to Frankfurt 1977.) This reading commits Descartes to a radical universal possibilism, inconsistent with other fundamental tenets of his philosophy. Such a position would be incoherent, not to say extravagant and eccentric. Many scholars, to avoid this conclusion, have tried to attenuate the consequences of Descartes's doctrine by a distinction between different kinds of necessary or eternal truths. Descartes, it has been claimed, exempts some necessary truths from his creation doctrine and hence distinguishes “eternal” truths which are held to be absolutely necessary and that even God could not change, from other “eternal” truths created by God, the necessity of which would not be absolute and that God, if he so willed, could annihilate. (Readings along this second line can be found in Guérout 1968; Funkenstein 1975; Curley 1984; Ishiguro 1986.) The problem here is not only where and how to draw the distinction between different kinds of necessary truths, but also to account for the relation between them, something no one so far has succeeded in doing in a satisfactory manner. Bennett (1994) has tried to steer clear of the difficulties of earlier interpretations, but ends up leaving Descartes as a kind of schizophrenic, divided between two incompatible strands of thought about truth, one pragmatist, the other objectivist or realist. The creation doctrine as Bennett reads it fits only the first. This leaves us with the further challenge of coming up with an interpretation that would fit all of Descartes's various statements on the issue.

Insofar as the two lines of interpretation share assumptions of rationality that Descartes rejects, they fail in doing justice to his statements on eternal truths. Descartes's view is radical indeed, but it is not incoherent, and it does not commit Descartes to any universal possibilism or irrationalist voluntarism (Alanen 1985, 1988). That the

incoherence is merely apparent becomes clear once one sees that it is a mistake to seek for a modal theory applicable to God's act of creation as well as to the truths he created and eternally wills. If one grants that there are no modal truths prior to God's act of creation, one can show, as Dan Kaufman has done, that the following three apparently conflicting claims: (1) the eternal truths are freely created by God; (2) the eternal truths are necessarily true; and (3) for any eternal truth *P*, God could have willed that not-*P* is true, can all be held by Descartes without inconsistency, and without (3) entailing universal possibilism (Kaufman 2002).

Descartes's doctrine raises important questions concerning the nature and foundation of rationality, of logical truth and conceivability. It is only against the background of these questions that it can be fully understood and assessed. But it is not directed to any of these questions. It is primarily a theological thesis, telling us something about God's nature and power that Descartes thought was important. What it tells us is that all things, actual as well as possible, including truth and goodness themselves, depend on God, in whom will and understanding and power are undistinguishable, and also that God's infinite and simple nature is beyond comprehension by the human understanding that can grasp things only piecemeal and by distinctions. This theological view, I argue, has unexpected consequences for the foundation of modality and rationality.

In the first part of this chapter I will present and briefly comment on Descartes's statements of his doctrine. In the second part I consider some of the most interesting interpretations and the difficulties they lead to. In the last part I develop my own reading of Descartes's creation doctrine and its significance for his view of rationality and its limits.

I

The most explicit statements of the doctrine that God has freely created the eternal (necessary) truths are found in Descartes's correspondence. Although it is not discussed at greater length in his published work, it is mentioned in the Replies to the *Meditations* (in the Fifth and Sixth Replies) and surfaces in the *Principles*. It is one of the points on which Descartes, whose thinking underwent considerable development in many other respects, never changed his mind. It is announced, for the first time, in a famous letter to Mersenne, where Descartes asserts that the mathematical truths, called eternal truths by Mersenne, are posited by God and entirely dependent on him. He also asks Mersenne to "assert and proclaim everywhere" that "these truths are laid down by God in nature, just as a king lays down the laws in his kingdom," that they are fully intelligible to us and "inborn in our minds just as a king would imprint his laws on the hearts of his subjects if he had power enough to do so" (3:23; AT 1:145).

It is interesting to note that when first discussing the foundations of eternal truths Descartes considers mathematical truths and holds the issue to be of special importance to his new physics. As we know from his published writings, Descartes's mechanistic science of nature is built on the assumption that the laws of nature are mathematical laws deducible from certain primitive and self-evident notions about God's nature (AT 6:41, 64; 8A:2, 83ff.; AT 11:47). None of the mathematical truths derivable from

inborn notions and exemplified in the order of nature are necessary or unchangeable in themselves. Descartes writes:

It will be said that if God has established these truths he could change them as a king changes his laws. To this the answer is: Yes he can, if his will can change. (To Mersenne, April 15, 1630, 3:23; AT 1:145–6)

But God's will cannot change. So, these truths are eternal and unchangeable, because God who wills them from eternity is immutable. Even so, they are not immutable because of any intrinsic necessity. Because they are freely established by God, they could be other than they are. To say that the laws determining all the motions in the universe are independent of God's will, would indeed be to subject God "to the Styx and the Fates," committing Descartes to a necessitarianism of the kind Spinoza eventually advocated, and which he was obviously very keen to avoid.

It is important to note the contrast Descartes sees between the intelligibility of the laws of nature on the one hand, and the incomprehensibility of God's power on the other. The laws of nature, assimilated in the next letter to Mersenne with the "essences" of things, are evident and fully intelligible to the human mind. (May 27, 1630, 3:25; AT 1:152). But the essences of physical things, according to Descartes, are reducible to mere extension. All the evident and certain truths that the human mind can discover about them are consequently mathematical truths concerning actual or possible modes of extension (see, for example, *Meditations* 5 and 6, AT 8A:380). They are fully intelligible because they can be derived from self-evident notions imprinted in our finite, created minds. They can be grasped by anyone using his intellect in the appropriate way. God's infinite nature, on the other hand, cannot be grasped by us: it is and remains incomprehensible. To say that the eternal truths, which we with our finite minds can comprehend, are uncreated and hence independent of God's intellect and power, would be to put God's mind somehow on a par with ours. It would be to say not only that we understand the same truths that God understands, but also that these truths are prior to and imposed, as it were, externally, on God's intellect, subjecting God's incomprehensible power to laws which are perfectly intelligible to our finite minds. These two interrelated claims about our cognitive powers are of great importance to Descartes's project: we can acquire a perfect science of nature by discovering the laws God has ordained for his creation, yet, because these laws or "essences" are freely posited by God, who transcends them, they are not part of and do not flow from his essence. We cannot and need not see ideas in God's mind to understand the laws of physics. God's omnipotence is not constrained by the laws in the world he has created, nor is his infinite greatness compromised by our science (Alanen 2003). The truths having essences, or which for Descartes is the same thing, possible beings, as their objects, are eternally true only because they are willed and made by God:

the eternal truths, . . . are true or possible only because God knows them as true or possible. They are not known as true by God in any way which would imply that they are true independently of Him. If men really understood the sense of their words they would never say without blasphemy that the truth of anything is prior to the knowledge which God has of it. In God willing and knowing are a single thing in such a way that by the very

fact of willing something he knows it and it is only for this reason that such a thing is true. So we must not say that if God did not exist nonetheless these truths would be true; for the existence of God is the first and most eternal of all possible truths and the one from which alone all others derive. (To Mersenne, May 6, 1630, 3:24–5; AT 1:148–9; passages in italics are written in Latin in the French text)

The passage is puzzling. The first line suggests that God's knowledge and hence intellect is somehow prior to the truth and possibility of the objects of his knowledge. But then we read that his willing something is prior to his knowing it. In fact Descartes rejects any distinction between God's willing and knowing the eternal truths, and it is not only their necessity but also their possibility as objects of knowledge (i.e., their very conceivability), that depends on God's will and knowing them. God's sovereignty is not limited by any necessary truths about possible objects, because the very possibility of things depends to the same extent as their existence on God's knowledge, will, and power. Descartes continues:

It is easy to be mistaken about this because most men do not regard God as an infinite and incomprehensible being, the sole author on whom all things depend; . . . Those who have no higher thoughts than these can easily become atheists; and because they perfectly comprehend mathematical truths and do not perfectly comprehend the truth of God's existence, it is no wonder that they do not think that the former depend on the latter. But they should rather judge on the contrary, that since God is a cause whose power surpasses the bounds of human understanding, and since the necessity of these truths does not exceed our knowledge, they must be something less than, and subject to, the incomprehensible power of God. (3:24–5; AT 1:148–9)

Although Descartes agrees with the Augustinians and Thomists that the eternal truths depend on God, he differs with them over how these truths depend on God. For them, the eternal truths are contained in God's intellect and are inseparable from the divine essence from which they emanate, according to the neoplatonistic imagery used by Descartes to depict the views he opposes, "like rays from the sun." Descartes's claim is that God produces the truths freely, as an efficient and total cause (*ut efficiens et totalis causa*). Producing the truths freely implies that God could have not produced them: "just as He was free not to create the world, so He was no less free to make it untrue that all the lines drawn from the centre of a circle to its circumference are equal" (to Mersenne, May 27, 1630, 3:25; cf. 2:294; AT 1:52). God's freedom of indifference differs from the human freedom in that it is not restricted to any prior alternatives (2:929; AT 7:433). Descartes recognizes that the notions of causality and creation are inappropriate in accounting for the way in which the eternal truths (moral and metaphysical as well as mathematical) depend on God, since they are not real existents. Yet, like political laws, they have some kind of "moral being," and God may be called their efficient cause, like a king may be called the cause of the laws he ordains (3:23; AT 1:146). The important thing is not to know how they depend on God, for this is something we cannot in fact understand, but to know *that* they depend entirely on him (2:294; AT 7:436).

Descartes has not changed his position from his early correspondence to the time of responding to the Sixth Objections (1640), and he still defends it in a letter to Arnauld,

July 29, 1648 (3:358–9; AT 5:223–4). He formulates his position almost verbatim in opposition to the view defended by Suárez (Gilson 1912; Cronin 1960; Marion 1980; Wells 1981). The theory endorsed by Suárez was shared by many late medieval thinkers and largely accepted also by Descartes's contemporaries. Descartes departs not only from this widely accepted doctrine, but also from common assumptions about rationality and the conditions of intelligibility in general shared by most of the Scholastic and early modern philosophers.

Descartes's Scholastic contemporaries made a distinction between God's absolute power and his ordinary power, defining God's absolute power in terms of the logically possible: God has the power to do anything that can be described without implying a contradiction in terms true and actual. God (by his ordinary power) could have created another world, or changed the physical laws he has ordained in the actual world. But God could not violate the laws of logic, he could not create, for example, a being which would be at the same time a man and an ass, for asinity cannot, according to good Aristotelian logic, be predicated of human beings without contradiction of the terms. What implies contradiction does not describe any possible or thinkable thing. This restriction on purely logical grounds was not taken to set any limits to or involve any deficiency in God's power, for what implies contradiction is neither feasible nor conceivable: it is nothing. Also, Aquinas stresses, one should not say of what is impossible in this sense that God cannot do it, but one should say, rather, that since it involves contradiction it cannot be done (ST 1a:25, 3; cf. Alanen 1985; Alanen and Knuuttila 1988).

But Descartes rejects this way of explicating God's power. In insisting that God has created or established the necessary truths as a free and efficient cause, he emphasizes, against the position he rejects, the total dependence of the necessary as well as the possible upon God's will. This, as some understand it, is to abolish the very distinction between the necessary, as that which cannot possibly not be, and the possible as that which may or may not be. Truth and logical consistency are separated too: Descartes, in fact, does not only seem to say that God can make (or could have made) necessary propositions untrue, he also asserts that God can make contradictories true together. Consider the following statements:

[A] I turn to the difficulty of conceiving how it was free and indifferent for God to make it not be true that the three angles of a triangle were equal to two right angles, or in general that contradictories could not be true together. It is easy to dispel this difficulty by considering that the power of God cannot have any limits, and that our mind is finite and so created as to be able to conceive as possible the things which God has wished in fact to be possible, but not to be able to conceive as possible things which God could have made possible, but which he has nevertheless wished to make impossible.

[B] The first consideration [that God's power is unlimited] shows us that God cannot have been determined to make it true that contradictories cannot be true together, and therefore that he could have done the opposite. The second consideration [that our minds are finite] assures that even if this be true, we should not try to comprehend it, since our nature is incapable of doing so. (To Mesland, May 2, 1644, 3:235; AT 4:118)

[C] But I do not think that we should ever say of anything that it cannot be brought about by God. For since everything involved in truth and goodness depends on His omnipotence, I would not even dare to say that God cannot make a mountain without a valley, or that

one and two should not be three. I merely say that He has given me such a mind that I cannot conceive a mountain without a valley, or an aggregate of one and two which is not three, and that such things involve a contradiction in my conception. (To Arnauld, July 29, 1648, 3:358–9; AT 5:224)

[D] I boldly assert that God can do everything which I conceive to be possible, but I am not so bold as to deny that He can do whatever conflicts with my concepts – I merely say that it involves a contradiction. (To More, February 5, 1649, 2:363; AT 5:272)

The interpretation of these crucial passages is controversial. Is Descartes thinking of real objective modalities – of truths which according to the common understanding are necessary or possible in themselves, absolutely? Or is he thinking of epistemic modalities, treating the necessary truths created by God merely as subjective, epistemic, or perhaps even as psychological necessities, dependent on the constitution of our minds? Did he even have any clear view of modalities? At one point he appeals to the principle of non-contradiction to argue that a consistent conception of God implies absolute indifference in God such that nothing can precede God's act of creation. He explains:

it is impossible to imagine that anything is thought of in the divine intellect as good or true, or worthy of belief or action or omission, prior to the decision of the divine will to make it so. I am not speaking here of temporal priority: I mean that there is not even any priority of order, or nature, or of 'rationally determined reason' as they call it, such that God's idea of the good impelled him to choose one thing rather than another. (2:292; AT 7:433)

The terminology in this last quote calls for an explanation. Most Scholastics recognized the following distinctions: first, a "real distinction" between independently existing things, and second, what Descartes (using a term from Suárez in his own framework) calls a "modal distinction," which applies to the distinction between a mode, e.g., the roundness of a stone – an accidental modification of its main attribute, extension – and the (extension of) the stone itself; and third, a distinction of reason, which was considered merely conceptual, and is the one that concerns us here. The distinction of reason was itself subdivided in two kinds: a distinction of reasoned reason (*d. rationis ratiocinatae*) with some foundation in reality, e.g., as between different aspects or formal properties in a thing which can be thought apart but not exist apart, such as rational and animal in man, or goodness and mercy in God, and a distinction of reasoning reason (*d. rationis ratiocinantis*) defined as a distinction made by human reason without any foundation in reality, that we would call purely terminological. Descartes holds that God's nature is simple and indivisible, so there is no foundation for a distinction of reason of the first kind between God's intellect and God's will (cf. 3:26; AT 1:153). Therefore, there can be no distinction of order, temporal or even merely rational, between God's thinking of something as good and his willing it:

For example, God did not will the creation of the world in time because he saw that it would be better this way than if he had created it from eternity; nor did he will that the three angles of a triangle should be equal to two right angles because he recognized that it could not be otherwise, and so on. On the contrary, it is because he willed to create the world in

time that it is better this way than if he had created it from eternity; and it is because he willed that the three angles of a triangle should necessarily equal two right angles that this is true and cannot be otherwise; and so on in other cases. (2:292; AT 7:433)

Leibniz found the consequences of this doctrine utterly disturbing and “strange.” If goodness, truth, and justice are what they are merely because God willed them, then the good is posterior to his will, and so cannot be “a motive of his will,” which “would be a certain absolute decree, without any reason” (Leibniz to Christian Philipp, end of January 1680, Loemker, 273). He also writes:

no one will maintain that justice and goodness originates in the divine will, without at the same time maintaining that truth originates in it as well: an unheard-of paradox by which Descartes showed how great can be the errors of great men; as if the reason that a triangle has three sides, or that two contrary propositions are incompatible, or that God himself exists, is that God has willed it so. (Leibniz on Pufendorf’s principles, letter of 1706; Leibniz 1988: 71–2)

Leibniz, however, overlooks the fact that Descartes does not allow any distinction and *a fortiori* opposition between the will and the intellect in God, who is simple and indivisible.

II

Descartes never explicitly defines what he means by “eternal truth.” The category of eternal truths, roughly, corresponds to the class of truths which are necessary in the traditional sense of truths whose denial involves logical contradiction. It is not restricted to logical and mathematical truths, however, but covers metaphysical and moral principles as well, like the above “God willed to create the world in time.”

According to the interpretation of Descartes’s doctrine of the creation of the eternal truths, which Curley misleadingly labels the “standard” interpretation, Descartes holds that there are in fact no truths in the above sense of necessary truths. This interpretation attributes to Descartes the view that anything whatsoever is possible, from a strictly logical point of view, for the Cartesian God. Curley construes this as the thesis that for any proposition p , p is logically possible ($(p) M(p)$). He observes there are serious systematic reasons for rejecting it: Descartes could not defend universal possibilism without giving up central tenets of his philosophy and science, indeed, without giving up his whole philosophical enterprise (Curley 1984).

Curley’s own interpretation may be less offensive and more plausible on systematic grounds, but seems, as he admits, to “trade one paradox for another.” Following Peter Geach, Curley reads Descartes’s doctrine as involving “not a denial that there are necessary truths, but a denial that those which are necessary are necessarily necessary.” Curley explores the idea by expressing it in terms of iterated modalities, using the symbolism of modal logic. Instead of the formula of unrestricted possibilism $(p) M(p)$, we would have: $(p) MM(p)$ (“for any p , possibly possibly p ”), with a corresponding iteration of modalities for necessity (Curley 1984: 581–3, 589ff.).

This proposal waters down Descartes's doctrine to the view Alvin Plantinga characterizes as a "limited possibilism," according to which modal propositions (propositions ascribing modality to other propositions) would be within God's control, but not the necessary truths themselves. God could not have made $2 + 2 = 4$ false; "he could only have made it the case that he could have made it false. He could have made it possibly false" (Plantinga 1980: 112–13). This, however, is in conflict with Descartes's explicit claim (quoted above) that God could make it untrue, for instance, that all the lines from the center of a circle to its circumference are equal, or that the three angles of a triangle are equal to two right angles. There are serious related problems with limited possibilism clearly exposed in Kaufman (2002).

Curley, who is aware of some of the problems of this reading, also speculates that Descartes was simply confused about the modal status he wanted to accord to the eternal truths, and Plantinga for his part notes that Descartes does not separate different kinds of possibilism, but seems to run both a "limited" and a "universal" possibilism together. The latter, however, is more in accordance with what Plantinga considers the "fundamental thrust" of Descartes's thought: it does not restrict God's control over the eternal truths in the way a limited possibilism would do (Plantinga 1980: 103–4, 112–13). But ascribing a radical universal possibilism to Descartes is problematic for both textual and systematic reasons, and would render his position not only inconsistent, but unintelligible and extravagant. To conclude, on the other hand, that Descartes had no clear and distinct idea of the nature of necessary truths and was simply confused about the status he wanted to accord them is neither charitable nor credible, and has little support in the texts.

Ishiguro (1986) and Bennett (1994) purport to escape this dilemma with which the alternatives so far considered leave us. Descartes's eternal truths, as we have seen, have a true and immutable nature that cannot be arbitrarily changed, once they have been created. These truths, Ishiguro suggests, can be described as "rules or forms of the working of the mind freely created by God." They depend on the constitution of our mind and are, in Kantian language, given "as *a priori* forms of thinking." Descartes's notion of modality is thus not merely epistemic or conceptual, "it does not depend on historical states of our knowledge, nor on the development of our concepts" (Ishiguro 1986: 461–3; cf. Wilson 1978). I agree that Descartes's eternal truths have the character of transcendental *a priori* conditions for rational thinking and science. They do not depend on any historical contingent facts about human cognitive psychology; rather, they are necessary, universal conditions of intelligibility for any created rational being or intellect.

But Ishiguro also finds in Descartes's theory of modality a distinction similar to the one Leibniz made between absolute necessity and necessity *ex hypothesi*, although it does not coincide with the Leibnizian distinction between the laws of logic and mathematics on one hand and those of physics on the other. Nor does it serve to distinguish truths that even God could not alter, e.g., truths about God's own nature or existence, which would be absolutely necessary, from others that would be hypothetical in the sense of depending on God's free act of creation. Instead, she argues, Descartes's distinction between absolute and hypothetical necessity is a distinction "within logic" itself, and it "arises from the way Descartes understands negation and from the fact that we

are bound by our thought and the expressive powers of our language" (Ishiguro 1986: 464).

This means that Descartes would recognize absolute non-epistemic modality: "the impossibility of actualizing something that falls under a contradictory concept is *absolute*" (Ishiguro 1986: 465). God could not have created our minds with the same concepts, say our numerical system with its symbols and rules, and at the same time made it true that $2 + 2 = 5$, or in general made what contradicts our concepts true. The sense of *absolute* here introduced may seem rather weak, to the extent that absolute modality is contingent on how the intellects created by God have been constituted, i.e., on what conceptual and logical apparatus they have been furnished with. Once that apparatus is given, it is impossible even for God to instantiate something that implies contradiction in our concepts. This also means that what is necessary, given our concepts, is not necessarily necessary. Cartesian necessity is not absolute necessity in the sense of the Scholastics and of Leibniz's "logical necessity," but rather more like Leibniz's hypothetical necessity which is dependent on God's choice. Necessity for Descartes is thus "a conditional modality" (Ishiguro 1986: 467).

This interesting and intriguing reading has the advantage of saving Descartes from the incoherence of universal possibilism, without restricting or watering down his doctrine the way limited possibilism does. Moreover, the impossibility of actualizing what is contradictory in our concepts is and remains absolute: Descartes's God could not make contradictories true, something that Ishiguro thinks he never asserted. It also saves Descartes's intuition that eternal truths could be other than they are, if God had decided to create them (and our intellects) differently. It even makes this intelligible in some way: we can conceive that the eternal truths could have been different, yet remain bound in our understanding by the ones God created. We can conceive, Ishiguro explains, "that God made us incapable of understanding other possibilities" (Ishiguro 1986: 467) – presumably, possibilities that are inconceivable to us now but would be conceivable in an altogether different conceptual system with different eternal truths. Briefly, Descartes can have it both ways: he can hold that the eternal truths could be other than they actually are, without committing himself to the problematic claim that actual contradictions could be rendered true by God's omnipotence. What he actually says in the passages Ishiguro refers to, is that God could have made necessary truths not to be true (Ishiguro 1986: 460). The eternal truths could at best be not true, i.e., God could have not made them at all, in which case they would lack truth value.

This reading can be supported by many but not by all of the texts. (Ishiguro refers to passages like [A], [C], and [D], above, while statements like [B], above, are more problematic for her reading.) Apart from this, it relies on assumptions about how Descartes understands negation – treating negation not as a content of a proposition but as an operation carried out on it, and this creates the asymmetry between the status of necessity and that of impossibility in Descartes's theory (Ishiguro 1986: 468). Given the concepts we actually are endowed with of number and other arithmetical symbols (including the rules governing their use), even God could not make it the case that $2 + 2 = 5$, nor could he make any other contradictory statement true: there is nothing to be made true. If, however, God had given us, as he was free to do, altogether different

concepts, or, if he had given us minds without any numerical concepts or arithmetical rules at all, propositions like $2 + 2 = 4$ would simply not be true, i.e., they would have no truth value at all. The necessity of the eternal truths is thus not absolute, but contingent.

This is perplexing, for as ordinarily understood, saying that a truth is contingent implies that it is possible and that it could be denied without contradiction. Possibility is ordinarily defined in terms of necessity and negation and vice versa. The negation or denial of a necessary truth is thought to be equivalent to the affirmation of a contradiction, so to say that a proposition is necessary is to say that its negation implies contradiction. Now if the impossibility of actualizing a contradiction (making a contradictory proposition true) is absolute, the impossibility of actualizing the negation of a necessary truth would seem absolute too. The point of Ishiguro's reading, however, is that if negation in this context is treated not as part of the content of the necessary truth negated, but as an operation carried out on it from outside as it were, denying a necessary truth becomes possible without involving the assertion of a contradiction. This avoids having Descartes make absurd claims about God making contradictory, i.e., unintelligible – worse, empty – assertions true. Nothing is asserted in a contradictory proposition; this is precisely why no one ever thought of this as involving any limitation on God's power.

But how helpful is this – in itself, ingenious – suggestion for understanding Descartes in the end? The evidence Ishiguro invokes – the discussion of error in the Fourth Meditation – is, at best, inconclusive (Ishiguro 1986: 468–9). However, indirect support for it has been found by Normore (2006) in the views of some medieval logicians who held that there is an important distinction to be made between affirmative and negative propositions, the former alone having existential import and hence truth value. Descartes applies this idea to not actually existing but to possible beings, which owe their possibility to God's will, so that "if God declined to will the possibility of some object, all affirmative modal sentences about that object would be false." There would be no triangles to affirm anything about. This reading explains "how necessary truths could be only contingently necessary without supporting the problematic claim that God could make contradictions true" (Normore 1992). But would it work here? The necessity of eternal truths is no less and no more absolute than the impossibility of true contradictions: both depend, to the same extent, on the concepts or the meaning of the terms in which they are stated, and to the extent that the latter are dependent on God's choice, so are the former.

Consider the following example from the letter quoted in [A], above, which Ishiguro uses in support of her reading. Descartes there explains that it is the limitation of our understanding that makes it inconceivable to us how God could freely have made it "false that the three angles of a triangle were equal to two right angles, or in general that contradictories could not be true together." The history of mathematics provides an illustration of how we should understand this:

Indeed we can see how the above proposition would be true in a Euclidian geometry and false in general in Riemannian geometry. Thus, as Descartes writes, God could instantiate two apparent contradictories (e.g., when each belongs to a different geometry). We learn that each of the apparent contradictories were conditional truths, dependent on distinct, different antecedent conditions and not contradictories. (Ishiguro 1986: 468)

Ishiguro's point is that we are not really using the same concept of triangle in different geometries. And, if we are not, then the propositions can hardly have the same content and hence they are contradictories only in appearance. Moreover, Descartes's point in the statement Ishiguro refers to, appears to be to deny that the possibility of making a self-contradictory proposition true can be intelligible to our limited intellects. Whereas God's power is unlimited, our power of conception is limited to "conceive as possible only things which God has wished to be truly possible, but not to be able to conceive as possible things which God could have made possible, but which he has nonetheless wished to make impossible." So we should not try to comprehend what by nature we are incapable of comprehending (3:235; AT 4:118–19).

The worry here is that the asymmetry between the negation of a necessary truth and the assertion of a contradiction invoked by Ishiguro does not, in the end, carry much weight. Necessity and impossibility are both hypothetical, or conditional, for they are both relative to the language and concepts in which they are formulated, or, if you prefer, to the constitution of our mind. One could put the point even more strongly and say that they depend on the very conditions of thinking and rationality as determined by God. However, once these antecedent conditions on which the content and truth of a proposition depend are assumed or given, its modal status (necessity and possibility as well as impossibility) is absolute. The asymmetry, if there is one, is, rather, in the scope of what God can do. Talking of language (conceptual systems) we could, without departing too much from Ishiguro's reading, say that God can create infinitely many languages – or sets of antecedent conditions – which are incommensurable, instantiating in the framework of one of them what would be unthinkable or impossible in another. In this attenuated sense God can render (apparent) contradictories true together. But God could not make a real contradiction true, so Descartes's most radical statements (quoted above) remain a puzzlement for this reading.

What speaks for it is that it lends an air of intelligibility to Descartes's enigmatic claims about modality without committing him to assumptions about *a priori* limits constraining God's omnipotence. We can somehow understand that God could have created such alternative ways of thinking that we do not have any access to. But this, I want to argue, is not really in its favor, since it goes against Descartes's explicit claims that no power or modality can be dissociated from God's actual willing and understanding, and that we cannot understand God's power.

A more promising line of interpretation is found in Frankfurt (1977), whose reading has been misrepresented as a standard example of attributing universal possibilism to Descartes (Curley 1984: 570). Frankfurt, too, understands the necessity of Descartes's eternal truths as a necessity relative to the nature of the human mind, and like Ishiguro he seems to consider them not as psychological but rather as some kind of Kantian *a priori* conditions for intelligibility and rational science (Frankfurt 1977: 45). Frankfurt however takes what Descartes says about the unintelligibility of God's unlimited power seriously, without attempting to explain (away) his enigmatic claims about God's ability to make what involves logical contradiction true and is, therefore, inconceivable to us. On the contrary, he takes those claims quite literally, and admits, as I think one should do, that the power Descartes attributes to God to make, e.g., the radii of a circle unequal, or any other self-contradictory proposition, true, surpasses

our understanding. To seek a logically coherent explication of such assertions is, as Frankfurt recognizes, a mistake.

How then does this reading avoid committing Descartes to a radical, universal possibilism? Frankfurt does not take Descartes to deny that there are necessary truths the denial of which involves logical contradiction and is hence inconceivable to us. What Descartes denies is not that there are truths that cannot be denied without contradiction. He denies that the very principle of contradiction in virtue of which things are non-contradictory and hence conceivable to created (rational) minds also determines what is conceivable or possible to God. We cannot conceive what is self-contradictory, but nothing follows from what we cannot conceive with respect to God's infinite power. Does this make modality subjective – relative merely to our minds? Only if one assumes in addition that there is some higher order absolute modality to which it can be contrasted – but there is none beyond our grasp. God's power transcends our understanding and is not intelligible in terms of principles and modal notions that depend on it. Instead of committing Descartes to some super notion of possibility that could account for God's power, the moral of Frankfurt's reading, as I understand it, is simply that there are no possible or necessary truths before or independently of God's voluntary act of creating them.

III

This is also the line of reading I shall pursue here. Let me first summarize the discussion so far. The idea that I take Descartes's controversial claims to express is, roughly, that it would be a mistake to assume some notion of modality in terms of which Descartes's concept of divine power could be explicated, and that we should not even try to do so. There is no modality prior to or independently of God's act of exercising his power – and priority here should not be understood merely as temporal, but as logical or rational priority. It would be equally misleading to interpret Descartes as embracing a "universal" or any other form of possibilism, as it would be to interpret him as holding that some things, prior to God's act of creation, are necessary. In either case, Descartes's view would be that these would be illegitimate attempts to understand God's power through "our" modal concepts, i.e., through the modal notions – the only ones there are – that God freely instituted and which cannot therefore be applied to his act of instituting them. The readings discussed here illustrate different ways of making the same mistake: namely, trying to find some common vantage point from which we could take measure of what God can and cannot do. Thus, on Curley's reading, God could make something that is now impossible, possibly possible, but he could not make it possible. On the reading defended by Ishiguro, on the other hand, God's power is limited to choosing one out of a number of fixed consistent sets of conditions of intelligibility. Curley and Ishiguro are driven to this because the alternatives would be either "universal possibilism," hence irrationalism, or the attribution of some other confusion and inconsistency to Descartes. In both cases the presupposition is what Descartes is most concerned to deny: that there is a modal order independent of and prior, in the order of reasons, to God's act of willing, understanding, and making something. For just as the idea of iterated modalities used by Curley to spell out his proposal presupposes that

of absolute modality, so does Ishiguro's idea of hypothetical, contingent necessity: both are granting precisely what Descartes's position draws into question.

A Leibnizian picture of an eternal order of intelligibility comprising an infinite number of (logically) possible worlds out of which God chooses to create the actual one is foreign to Descartes. So is the logical version of it that Ishiguro finds in Descartes, where not only the laws of physics but also the conceptual scheme which makes the world intelligible to us are contingent on God's decision. In the first case (Leibniz), a preexisting logical order of compossibility and mutual exclusion structuring the relations between the things in the alternative "worlds" is thought to be fixed from eternity. In the second case (Ishiguro), logical relations of consistency and semantic rules of the "conceptual schemes" are determined in advance and independently of God's choosing them. It is not even very clear how the notion of choice is supposed to work in the latter case – what kind of choice or decision would there be for God to make here? We do know that Leibniz's God is bound to choose the "best" out of an infinite number of possible worlds. What could guide Ishiguro's Cartesian God in the choice between conceptual schemes? If there is no way of specifying the principles for deciding between alternative schemes, then it is not clear what light this can shed on God's power in the first place.

As I understand it, any model separating an order of intelligibility from that of possible and actual physical being (essences and existing things) created by God is excluded by Descartes's view of omnipotence, where seeing, willing, and making are all one. Descartes, some may say, had a poor grasp of logic and of modal logic in particular, but he was not confused on this point: he did not offer his doctrine of the creation of the eternal truths as an account of modality or of the foundations of logic for that matter. Instead, he held on to the idea of God's simplicity and transcendent nature. The world and the things God created come with a modal structure which is fixed and immutable only because God wills and orders it in this way, but nothing precedes and nothing predetermines that order which is freely established, *ex nihilo*, by God. In making the universe, God makes things and their interrelations determining also the principles for their conceivability. Those principles, being set by God, cannot determine his acts of creation. But then there is no way we can explain or understand them. There is no common, absolute frame in which questions about what is possible independently of what God has made possible can be posed. Nor are there, as stated before, independent standards of rationality or possibility, shared by created rational beings and God, by means of which his acts could be explained and evaluated.

Does it follow from what has just been claimed that modality is merely "subjective," i.e., for us? The following problematic passages from the Second Replies seem to suggest two conflicting conceptions of modality:

If by *possible* you mean, as all commonly do, whatever does not conflict with human concepts (*illum omne quod non repugnat humano conceptui*), then it is manifest that the nature of God is possible in this sense. . . . Or else you must fancy (*Vel certe fingitis*) some other kind of possibility pertaining to the object itself, but which, unless it agrees (*conveniat*) with the first kind can never be known by the human intellect. (2:107; AT 7:151)

Possibility here is characterized in terms of absence of contradiction, like the absolute possibility of the Scholastics, and this is assimilated to what is conceivable in terms of

human concepts, opposing it to some feigned object-related possibility. If one feigned or fancied there were something in actual or possible reality over and beyond what is conceivable in terms of human concepts, that is, some possibility inconceivable to us, one would know nothing about it. Descartes continues:

All self-contradictoriness (*omnes implicantia*) or impossibility (*impossibilitas*) is solely in our concept (*solo in nostro conceptu*), which cannot join together mutually inconsistent ideas (*ideas sibi mutuo adversantes male conjungente*), it cannot be posited in anything which is outside the intellect. For the very fact that something is outside the intellect makes it manifest that it is not self-contradictory but that it is possible. Self-contradictoriness in our concepts arises merely from their obscurity and confusion, and can never be in clear and distinct ideas. (2:107–8; AT 7:152)

Bennett thinks that absolute possibility is here reduced to mere subjective possibility. That $2 + 2 = 4$ and its denial cannot be true together means that they cannot, given the concept of numbers we have, be joined together by our minds. Descartes treats the “possibility which relates to the object itself” as a contrivance, something “faked up for purposes of argument rather than part of our natural conceptual repertoire.” Descartes offers a “conceptualist analysis” defining possibility by relation to “our” concepts, and taking this subjective concept “as the common meaning of the term ‘possible’.” Concepts are not entities belonging to a Fregean third realm, but “aspects of the human condition” (Bennett 1994: 648). There is no modality independently of human concepts: God in creating our concepts creates modality too. “God gives modal truths their status as truths. He makes it necessarily true that $2 + 2 = 4$ by making us unable to conceive otherwise” (Bennett 1994: 649). Necessity and possibility are subjective – relative to God-given human concepts – and there is no modality beyond them.

Descartes does equate (absolute) possibility with absence of contradiction in terms, but this does not make for a subjectivist interpretation of modality. Moreover, he does seem to stress that the terms here are “human concepts” but, I want to argue, it does not follow that they are subjective. What Descartes says in the passage quoted above need not be read as severing the possibilities or possible beings to which we have epistemic access from the (possible) objects themselves, considered independently of the concepts through which we conceive them. The “possibility pertaining to the object itself” is not a contrivance faked up for the argument. What is invoked as counterfactual here is not that there are no concept-independent possibilities, but that there would be some such possibilities inconsistent with those (objective possibilities) that our ideas give us access to. There is, with respect to the latter, no gap or veil between our ideas, more precisely, between the objective reality (content) of our ideas and the objects they directly present (Normore 1986; Alanen 2003). To the extent that our ideas are clear and distinct, they are of objective realities or essences (i.e., possible things), which are God’s creations too, and so depend in no way merely on the concepts the human mind happens to be furnished with. Those essences are immutable, human concepts may vary.

The true propositions describing their natures should neither be thought of as absolute (God-independent), nor as relative (mind-dependent), but as simply necessary, and when clearly and distinctly understood, we know they are true necessarily by seeing that they cannot be denied without contradiction. Possibility as well as necessity depend

on the essences and things God created and it so happens he also made them conceivable to human minds. Nor are there two kinds of possibility or possible truths of the kind the Scholastics assumed, one absolute, defined in terms of logical possibility, independent of God but coextensive with what they called God's "absolute" power, and one relative, depending on God's "ordained" power, i.e., on the laws he ordained for the world he created. Possibility and necessity both depend to the same extent on God's power, though a better way to describe them is to say they are simply possible and necessary. Far from distinguishing between absolute and relative necessity there is for Descartes only necessity and possibility of one kind, *simpliciter*: what can be stated without contradiction is possible and what cannot be denied without contradiction is necessary. There are no further distinctions between kinds of modality for Descartes.

IV

It may seem that we have ended up with a new problem here because God's power now starts to look as brute and unintelligible causation. But that is because we humans with our limited minds cannot understand free action as not presupposing some distinctly conceivable alternative courses of action for the agent to perceive and deliberate about prior to acting – there is no way we can conceive what it is to will, make, and understand something in one single act. Again, if there is a lesson to draw from Descartes's radical ways of expressing his doctrine of the creation of eternal truths, it is precisely that we do not understand God's power – something that medieval logicians tried to do in explicating it in terms of formal, logical possibility. But then, all we seem to have is what Normore refers to as the "covenantal tradition" (within which the modern notion of law of nature developed) and God's word for it: we can invoke God's promise or covenant to his people that he will himself abide by the laws he imposes on nature. The evidence of God's promise to maintain the order of nature and give us access to it is however shaky: "there is an important sense in which the covenantal tradition hangs in mid-air. According to its picture if Nature exists it is by God's free agreement, but whether that agreement is forthcoming is not entirely clear" (Normore 2006: 275). The same worry raised about the laws of nature and their immutability arises about the laws of reason in Descartes: we can but trust that they remain unchanging, and as Normore interprets Descartes, God's immutability is his only answer to why they do. As I read Descartes, another answer suggests itself, which consists in seeing that the very question (why should one trust the laws of reason?) makes little sense. Why should we even care, since there is no way we can draw the necessity of eternal truths into question or persist in doubting them? If we understand "something very simple and straightforward in arithmetic or geometry, for example that two plus three added together make five," and understand such things "clearly enough to affirm their truth" – then we simply cannot believe that they could be false, for instance, that "two and three added together are more or less than five, or anything of this kind in which I see a manifest contradiction" (2:25; AT 7:35). So we cannot but accept and affirm their truth. The force of the "cannot" is not a matter of mere psychological conviction, for there is no sense we can make of things being other than they are clearly and distinctly

perceived to be. Indeed, we cannot even think them even if we try, for all we do in trying to do so is form statements or propositions to which no content can be given, and which cannot therefore serve as vehicles of coherent thoughts. The whole worry (about truths being produced by some brute force out of nothing) only arises if one assumes that there must be some prior logical truth and modality for God to produce things, providing them with, as it were, an intelligible foundation. But why should one make such assumptions? Explanations come to an end somewhere, and God's unfathomable power of creation is such an end for Descartes.

We can now see what distances Descartes from Suárez and other "Scotists," when insisting that nothing is "true or possible independently of God" (3:24; AT 1:149), while opposing at the same time the views of Augustine, Aquinas, and the Christian Platonists who think of the essences as part of and contained in God's eternal and rational nature, claiming instead that they are created by God as their "efficient and total cause." What he offers instead is not another logical or metaphysical theory, but rather a confession of ignorance:

I do not conceive them as emanating from God like rays from the sun; but I know that God is the author of everything and that these truths are something and consequently that he is their author. I say that I know this, not that I conceive it or grasp it; because it is possible to know that God is infinite and all powerful although our soul, being finite, cannot grasp or conceive (*concevoir*) him. In the same way we can touch a mountain with our hands but we cannot put our arms around it as we could put them around a tree or something else not too large for them. To grasp (*comprendre*) something is to embrace in one's thought; to know (*savoir*) something, it is sufficient to touch it with one's thought. (3:25; AT 1:152)

If one wanted to reserve the word "created" to existing things, Descartes proposes as equivalents "disposed or made" for the act whereby God produced the essences or eternal truths (3:25; AT 1:151–2). Eternal truths, as he explains elsewhere, "have no existence outside our thought" (1:208; AT 8A:22; 1:209; AT 8A:23; see also the Conversation with Burman, AT 5:167). What marks them out is that it is impossible for us to recognize or accept their denial: we accept them as eternal truths because their denial involves contradiction and is unthinkable. Descartes lists a version of the very principle of non-contradiction as one of his examples ("It is impossible for the same thing to be and not to be at the same time"), but he does not sort out logical principles from mathematical or metaphysical principles in this context or elsewhere (1:209; AT 8A:23). Descartes appeals to the impossibility to recognize their denials, or to the necessity we experience to accept such truths (for instance, in the Second and Fourth Meditation), but that, as already argued, is not an appeal to psychological facts about how our minds are working. In denying existence to these principles outside our thought, or in talking of concepts as our *human* concepts (2:107; AT 7:151), Descartes does not deny their objective validity, nor reduce the conceptual necessities to psychological laws: they are not general laws describing observable thinking habits. That the eternal truths reside in our minds does not mean that they are codifications of regularities governing actual thought processes, rather they are universal preconditions or norms for rational thought in general. We do not always pay attention to or abide by

them – most of what goes on in our minds in the ordinary course of life does not qualify as clear and distinct perception, but are rather confused and obscure thoughts. But to the extent we do aspire to truth and true judgments we should carefully pay heed to what we understand clearly and distinctly, and so pay attention to the eternal truths “residing” in our minds. The radical skepticism feigned in the First Meditation illustrates that serious doubts about what we evidently perceive are not possible without extravagant suppositions like that of the Evil Genius (2:25; AT 7:36). But we should not be so presumptuous to think that God in creating them had to abide by them as well, or that there is a domain of objects of thought – of possible beings and logical truth – prior to God’s making anything which we could have access to and share with God.

In several contexts Descartes treats the fundamental laws and concepts of physics as comparable to truths of reason, and claims that just as it is impossible, as everybody agrees, to conceive logical contradictions, it is impossible to think of a universe which is limited or contains a vacuum (3:363; AT 5:272; 3:358–9; AT 5:224). This shows how little Descartes paid attention to or cared to make distinctions which Leibniz took pains to draw between different kinds of necessity, like hypothetical or physical and logical or absolute necessity (adding also that of moral necessity). Where would he have come out had he done so? Would he, since he here also refers to how our minds are made, have thought of the laws of nature as necessary only in relation to the kind of concepts our minds are equipped with, or would he instead have thought of their necessity as related to the nature of things God had made? He goes, as we know, out of his way in the *Meditations* to argue that God in his benevolence did create the two together, matching our understanding and its basic concepts to grasp the nature of the things he created. Would, he, furthermore, have made a difference between the principles of logic and other truths – treating the former as purely formal conditions of thinking? We can only speculate about what the answer would be, had he made distinctions between form and content of thoughts or propositions of the kind discussed ever since Kant.

I suggest his most radical statements are intended to mark the incommensurability between God’s intellect and ours. The thought that God’s intellect could be accessible to the human mind was heresy to Descartes. Why should the acts or contents of an infinite and incomprehensible being satisfy the criteria of intelligibility to which our reason and understanding of the world have to conform? To take this for granted is not only to presume that God has created the human intellect to resemble his own (the only difference between a finite and an infinite mind would be a difference in scope), it is also to say that God *could not* have created the human mind in any different way. Any intellect or mind would be bound to the same set of possibilities. Such consequences are unacceptable to Descartes, because they are, as we have seen, incompatible with what he considers to be a true conception of God’s simple and indivisible nature.

In some of the texts Descartes seems to give priority to the will and hence to reverse the traditional ordering of God’s faculties. His position, on this ground, has been characterized as an extreme voluntarism. This label as I see it is inadequate and makes sense only given traditional distinctions between reason and will that Descartes rejects. Voluntarism, as ordinarily used, presupposes not only a distinction but also an opposi-

tion between reason and will, and it is usually, because of this contrast, associated with irrationalism. But there are no such distinctions to be made with respect to an omnipotent creator whose nature is simple, indivisible, and infinite, something which we can know but not conceive. To conceive (*concipere*) or grasp (*comprehendere*) are the ways our finite mind cognizes things clearly and distinctly, but they cannot extend to the infinite. Since our mind operates by distinctions and by delimiting its object it can give us only a partial and incomplete grasp of it. We can think of God as willing, or as understanding, or as making something, but not all at once and not as producing anything whatsoever, of making anything whatsoever true and good. We can add up bits and pieces of distinctly conceived separate divine attributes *indefinitely*, but this can never amount to understanding his infinitude (3:339; AT 5:154). At best, our understanding can touch, but not encircle, the infinite.

Descartes's view is very different from that of mainstream rationalists, but it is neither irrationalist nor incoherent. It has been seen, though incorrectly, as anticipating, for instance, Carnapian conventionalism or Quinean naturalism (Wilson 1978), and Bennett (1994) has found a streak of pragmatism in Descartes because of his treatment of eternal truths. Comparing historical theories to much later work can be awkward, and easily misleading, not least in this case, because Descartes ignores most of the distinctions between different kinds of necessary principles and truths that later theories presuppose. Yet if one wants to look for parallels with more familiar views closer to home, my own preference is for the kind of anti-foundationalism one associates with Wittgenstein. If truth, modality, and goodness have no other basis than the (to us incomprehensible) command by which God decreed them, then there is no independent rational or moral justification to be given for them. That Descartes and Wittgenstein seem to have shared certain intuitions about the appropriate ways of thinking about God and the role he is made to play in rationalist explanations appears from some remarks by the latter in a discussion about theological ethics and the right conception of the essence of good. Wittgenstein is reported to have made the following remarks against the rationalists represented by Schlick, who held that there is a reason for why God wants the good:

according to the shallow interpretation the good is good because God wants it; according to the deeper interpretation God wants the good because it is good. I think it is the first conception that is the deeper one: good is what God commands. For it cuts off any explanation as to "why" it is good. To say: "It is good, because God commands it" is, Wittgenstein adds, "the right expression for the lack of foundation (*Grundlosigkeit*). (Quoted in Waisman 1967: 115)

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Chapter 22

Descartes's Dualism

MARLEEN ROZEMOND

Mind-body dualism is widely seen as an enormously important contribution made by Descartes to philosophy: the mind or soul is an entity distinct from the body and can exist without it. A moment's reflection reveals that this can't be quite right, however: the idea that human beings have an immaterial soul that can survive the death of the body is at least as old as Plato. Nevertheless Descartes's views were novel in his day, but for a different reason: he redrew the boundary between the mental and the physical. In doing so he formulated a conception of the mental that underlies modern treatments of the mind-body problem. The first section of the present chapter will be taken up with Descartes's novel conception of the mental.

Another way in which Descartes's treatment of dualism is significant is due to an argument for dualism he offered, and that continues to draw attention not just from scholars in the history of philosophy, but also from within contemporary philosophy of mind (see Schiffer 1976; Shoemaker 1983; Almog 2002). Descartes's dualism and this argument for it are widely seen as focused on claims about the separability of mind and body, but I will offer an alternative interpretation. In the second section I will examine his dualism, and argue that it does not consist in the idea that mind and body are separable. This prepares the way for my analysis of his well-known argument for dualism in the third and fourth sections. I conclude by relating Descartes's dualism and this argument to its historical context as well as contemporary discussions of the mind-body problem.

Descartes's Novel Conception of the Mind

The most important philosophical background for Descartes is Aristotelian Scholasticism. He was raised on it, and saw himself as offering an alternative to it, although, as I will illustrate, he retained some of its views. For the Aristotelians, the soul, *anima*, is the form of the body. The soul of a particular living being, say a cow, makes it the particular kind of living thing that it is. It is the principle of life and explains the range of activities that manifest life: nutrition and growth in plants, in animals also motion and sense perception, in humans in addition intellectual activity and will. For the

Scholastic Aristotelians with their Christian commitment to an afterlife, the human, intellectual soul can exist after the death of the body. In what follows I will relate Descartes's views to those of Aquinas. Aquinas, of course, predates Descartes by some four hundred years, but on the issues I will discuss, Scholastics temporally close to Descartes and cited by him were in agreement with Aquinas.

Aquinas argued that intellectual activity must be performed by an incorporeal being:

The intellectual principle, which is called the mind or intellect has an operation through itself [*per se*] in which the body does not participate. Nothing, however, can operate through itself unless it subsists through itself; for activity only belongs to a being in act, and hence something operates in the same way in which it is. For this reason we do not say that heat heats, but that something hot heats. Consequently, the human soul, which is called intellect or mind, is something incorporeal and subsisting. (*Summa Theologiae* 1.75.2)

So intellectual activity is an operation of the human soul alone – as opposed to the body-soul composite – and this requires that the soul is a subsistent entity, that is, an entity that exists in its own right, and that can exist without the body. Aquinas and other Scholastics had a different view of sense perception and other activities we now regard as mental. Sense perception pertains to the soul-body composite, or the ensouled body, rather than the soul alone (*Summa Theologiae* 1.77.8). Consequently, there is a striking difference between Aquinas's conception of the soul and modern worries about the mind-body problem: Aquinas focuses on human *intellectual* activity in defending the soul's incorporeity. In contemporary philosophy the hardest question about whether the mental can be understood in physical terms is about consciousness, and focuses on what it's like to have experiences that belong to the realm of the sensory, for example, pain or color sensations. This difference finds its origin in Descartes's reconceptualization of the mental.

Unlike his Scholastic predecessors, Descartes in effect identified the soul with the mind, and departed from their position by narrowing the role of the soul while expanding the role of the mind. He narrows the role of the soul by making it the principle of thought and removing from it other traditional manifestations of life: nutrition, growth, motion. Thus he explains to Gassendi:

the first men did not perhaps distinguish between, on one hand, that principle in us by which we are nourished, grow, and perform without any thought all the other functions we have in common with the brutes, and on the other hand, that principle by which we think. They applied to both the single term 'soul'. Then, noticing that thought is different from nutrition, they called that which thinks 'mind', and believed that it is the principal part of the soul. I, however, noticing that the principle by which we are nourished is entirely different from the principle by which we think, have said that the term 'soul' is ambiguous when it is used for both. And in order to understand it as the first act or principal form of man, it must only be understood as the principle by which we think. To this I have as much as possible applied the term 'mind', in order to avoid ambiguity. For I do not regard the mind as a part of the soul, but as the whole soul, which thinks. (2:246; AT 7:356)

Descartes writes here that the term ‘soul’ is ambiguous, and allows that in some sense of soul traditional roles of the Aristotelian soul other than thought involve a soul. But he relegated the latter to the realm of mechanistic explanation, which in effect amounts to removing them from the soul. This expansion of the role of mechanistic explanation is not explicit in the *Meditations*, but it is central to his well-known discussion of humans, animals, and machines in the *Discourse* Part Five. There Descartes argues that the human body is a machine. Human beings also have a rational soul, which accounts for thought, and which cannot be explained mechanistically. So our having a soul accounts for behavior that manifests thought, such as language, but animals are *just* machines; all of their behavior can be explained mechanistically (1:139–41; AT 7:55–60).

Nowadays philosophers tend to question Descartes’s view that the mental cannot be explained scientifically and that it must be immaterial. But from the perspective of his contemporaries, Descartes’s view of the scope of materialistic scientific explanation was remarkable for its optimism. Arnauld’s reaction illustrates the point:

It seems incredible at first sight that it can happen without the help of any soul that the light reflected from the body of a wolf into the eyes of a sheep moves the very thin optical nerves, and that upon that motion reaching the brain, animal spirits are diffused through the nerves in such a way as is necessary to make the sheep flee. (2:144; AT 7:205)

So Descartes restricts the notion of the soul to mind and thought. On the other hand, he expands the conception of the mind with respect to the Aristotelians, for whom the mind was the intellectual, rational element in us. For Descartes, the mind or thinking subject is “a thing that doubts, understands, affirms, denies, is willing, is unwilling, imagines also and senses” (2:19; AT 7:28). So he broadens the conception of the mind when he gives it functions like sense perception and imagination, which for the Scholastics are functions that pertain to an ensouled body as a subject.

Dualism, Substances, and Principal Attributes

Descartes’s dualism, it is important to remember, is substance dualism: his point is that mind and body are distinct substances. He stated his dualism by claiming that mind and body are really distinct. What does it mean for mind and body to be really distinct? Some interpreters think his dualism consists in the separability of mind and body (Wilson 1978: 185–90). It is certainly true that Descartes was interested in the modal claim of possibility of mind existing without body; this mattered for the possibility of an afterlife (2:10; AT 7:13). But in my view his dualism does not consist in this modal claim. Furthermore, contrary to common opinion, I do not think that modal claims about the separability of mind and body are central to his principal argument for dualism, which I will refer to as the Real Distinction Argument. Instead, central to this argument and to Descartes’s dualism is his conception of substance and of the essence of mind as a thinking substance and body as an extended substance, where “essence” is understood in a non-modal sense. Indeed, I believe that these claims capture important elements of what still grips us (or at least some of us) about this argument: the

nature or essence of thinking strikes us as radically different from the nature of body and this raises the question whether mind and body are distinct things. In the present section I will examine Descartes's dualism and argue that it should not be understood as consisting in a modal claim. This requires an exploration of his notion of real distinction and his theory of substance. In the next section I will turn to the Real Distinction Argument.

For Descartes, a real distinction between two entities consists in the fact that they are different substances (*Principles* 1.60; 2:9, 54, 159, 285–6; AT 7:13, 78, 226, 423). The notion of real distinction was not new with Descartes and had its roots in the Scholastic theory of distinctions. An important treatment of the issue can be found in Francisco Suárez's *Disputationes metaphysicae*, a very influential work in the seventeenth century. Suárez defined real distinction as a distinction of one thing from another: *una ab alia re*. The term thing – *res* – is here a technical term: modes are not *res* in this sense, as Suárez makes quite clear (*Disputationes metaphysicae* 7.1.1). In this technical sense, for Descartes, only substances are *res*, modes are not, and he too sometimes uses the term *res* in a sense that excludes modes (see 2:54; AT 7:78; see translation given below). For Suárez, separability was a *sign* of real distinction. He regarded separability as sufficient but not necessary for a real distinction, and so separability is not constitutive of real distinction (*Disputationes metaphysicae* 7.2.9–27). Descartes sometimes defines real distinction in terms of separability (2:114; AT 7:162), but in the Second Replies he presents separability as a *sign* of real distinction (2:95; AT 7:132). This suggests that for Descartes too real distinction does not consist in separability.

Descartes wrote that a real distinction obtains between substances and so his notion of substance is important. He defines substance as a thing “that so [*ita*] exists that it needs nothing else in order to exist” (*Principles* 1.53). It is tempting to read this definition as claiming that substancehood consists in the ability to exist apart from anything else. In that case a real distinction would, after all, reduce to separability. But this definition claims that a substance needs nothing else in order to exist *as a result* of its actual mode of existence: a substance “so [*ita*] exists that it needs nothing else in order to exist.” What could this mean?

Descartes's basic ontology contains substances and modes. A mode exists in or through something else, a substance, whereas a substance exists or subsists through itself, it is a *res per se subsistens* (3:207; AT 3:502; 2:157, 159; AT 7:222, 226; 1:297; AT 8A:348). Descartes also characterizes a substance as that “in which inheres [*inest*] immediately, as in a subject, or through which exists something that we perceive, that is, some property, or quality, or attribute, of which a real idea is in us “ (2:114; AT 7:161). These two characterizations are two sides of the same coin: substances are those entities that exist in their own right; modes exist through them, by inhering in them. Again, this characterization follows a characterization of substances and qualities common within Aristotelian Scholasticism. Intuitively, the idea is that a substance can exist without anything else, *because* it has existence in its own right, it is a thing in its own right. Modes are qualities, properties of things; they exist by inhering in something else, and this is why they cannot exist without a subject of inherence. A piece of wax is a thing, which exists in its own right. Its shape and size are properties of it, which exist by belonging to the piece of wax. As a result, if one were to destroy

the piece of wax, the shape and size would disappear. The piece of wax itself is not a property of something else such that its existence depends on that entity in this way.

Implicit in this picture is Descartes's view of modes as particulars: the particular shape of the wax as opposed to the general quality of being, say, round, can't stick around without its particular subject of inherence. This is not to say that the items in question have no dependence relations other than this ontological one, in particular causal relations. But causal relations are irrelevant to the notions of mode and substance – or, to be precise, causal relations among creatures are irrelevant: Descartes regards the fact that created substances are causally dependent on God as relevant to the sense in which created things are substances. So what Descartes wants to establish regarding mind and body is that each is a thing in its own right, and that they are different kinds of things. In sum, the fundamental idea of the real distinction between mind and body does not consist in modal claims about separability, but it does have modal consequences.

The non-modal understanding of the real distinction of mind and body is actually quite important to Descartes's interest in dualism. He aims to assign to body only those modes that can be dealt with by mechanistic explanations. The mind is the incorporeal subject of states that cannot be so understood. In this way he aims to provide meta-physical support for his view that mechanistic explanations can account for all phenomena in the physical world. But this concern with mechanism relates only to the idea that mind and body are substances with different types of properties, and not to their ability to exist apart. (It is worth noting that philosophically speaking one could separate the two realms of explanation without adopting substance dualism, as Donald Davidson's anomalous monism illustrates.) The idea that the mind is a different kind of substance is also important for the afterlife: prominent in the history of this issue is the idea that bodies always eventually go out of existence by falling apart. If the soul is not a body, its nature is different, and this helps support its immortality.

In the *Meditations* the importance of a non-modal understanding of the real distinction of mind and body comes out right after the conclusion of the Real Distinction Argument. Descartes concludes the argument as follows: "it is certain that I am really distinct from my body, and can exist without it" (2:54; AT 7:78). Descartes does here express the modal idea that he (that is, his mind), can exist without his body. But right after he writes:

Moreover, I find in me faculties for certain special modes of thinking, namely the faculties of imagining and sensing. I can clearly and distinctly understand myself as a whole without them; but not vice versa them without me, that is, without an intelligent substance in which they inhere: for they include some intellection in their formal concept, and hence I perceive that they are distinguished from me as modes from a thing. I also recognize certain other faculties, such as the faculty to change place, to have various shapes and the like, which can no more be understood without some substance in which they inhere than the preceding ones, and which therefore can also not exist without it: but it is manifest that if these [faculties] exist, they must inhere in a corporeal or extended, not an intelligent substance, because their clear and distinct concept certainly contains some extension, but no intellection. (2:54–5; AT 7:78–9)

Descartes does not breathe a word here about the afterlife, for which the modal claim of the mind's ability to exist without the body is important. Instead he focuses on the idea that mind and body are different kinds of substances each with different kinds of modes. Sensation and imagination belong to him, that is, his mind; the "faculties" for changing location, taking on various shapes and the like belong to a corporeal substance.

This leads us to another feature of Descartes's theory of substance that is crucial for our purposes, and that is his conception of the essence of a substance, which he calls its principal attribute:

[T]here is one principal property for each substance, which constitutes its nature and essence and to which all the other ones are referred. Namely, extension in length, width and depth constitutes the nature of corporeal substance; thought constitutes the nature of thinking substance. For everything else that can be attributed to body presupposes extension, and is only some mode of an extended thing; and similarly anything we find in the mind, is only one of the different modes of thinking. So for instance, figure can only be understood in an extended thing, motion in extended space; and imagination, sensation or the will only in a thinking thing. But on the other hand, extension can be understood without shape or motion, and thought without imagination or sensation and so on – as is obvious to anyone who attends to the matter. (*Principles* 1.53)

Given that he is talking about essences, one might expect Descartes to insist that a substance cannot exist without its principal attribute, since the essential properties of an entity are widely understood to be properties without which that thing cannot exist. Now he does believe a substance cannot exist without its principal attribute, but this feature is not what makes it the essence of a substance: other attributes also necessarily belong to a substance (if it exists), such as duration, number, and existence (*Principles* 1.56, 62). These are generic features that belong to any kind of substance. Instead, for Descartes, a principal attribute is the essence or nature of a substance because all other specific types of features of substances, its modes, are "referred to" this attribute. They are ways of being of the principal attribute, and, as he often says, *presuppose* it, both ontologically and epistemologically; they cannot exist or be understood without their principal attribute. And so the principal attribute determines what properties a substance has. The intuition behind Descartes's view is not difficult to grasp. A principal attribute is like the atomic structure of, say, gold, which determines the properties and behavior of gold, such as its color, weight, and solubility in aqua regia. So contrary to what one might expect, the principal attribute does not constitute the essence of a substance in virtue of being inseparable from it, rather its role in underlying the modes of a substance is crucial.

Descartes does not explicitly use the notion of principal attribute in the *Meditations*, but it is present in the background. In fact, we saw its role as what underlies the modes of a substance surface in the Sixth Meditation, when he writes that sensation and imagination are modes of his mind, because "I can clearly and distinctly understand myself as a whole without them; but not *vice versa* them without me, that is, without an intelligent substance in which they inhere." And motion, shape, and size are modes of body, because their clear and distinct conception contains extension (2:54–5; AT 7:78–9).

It is useful to compare Descartes's conception of substance to two other ones: a view one might call the Bare Subject View, and the Aristotelian Scholastic conception of corporeal substance. On the Bare Subject View a substance just is a subject of inherence of properties. (This view is sometimes attributed to Locke: see Locke 1975: Bk. 2, ch. 23. For a different interpretation of Locke's conception of substance, see Ayers 1975. For a comparison of Descartes and Locke, see McCann 1986.) Properties inhere in the substance, but are not constituents of a substance. For the Aristotelian Scholastics, on the other hand, a corporeal substance is a composite of prime matter and substantial form. Prime matter is a bare subject in the sense that it, too, is in itself featureless and it is the bare subject for substantial form. But the substance consists in prime matter plus substantial form, and this composite is the subject of various types of accidents such as qualities and relations.

Descartes clearly rejects the Bare Subject View: he thinks a substance contains its principal attribute. Thus he explains that in order to think of something as a complete thing – which means for him: a substance – one must include the principal attribute. For instance, in order to understand shape as a complete thing one needs to include extension and substance – not just substance (letter to Gibieuf, 2:156; AT 7:221). In fact, Descartes seems to hold a view that is exactly the opposite of the Bare Subject View. For sometimes he claims that a principal attribute and its substance are the same thing considered in different ways, and this suggests that the principal attribute constitutes the entire substance, and that there is no bare subject of inherence at all (*Principles* 1.63; 1:297; AT 8B:348). The identification of substance and attribute is also suggested by Descartes's rejection of the Scholastic notion of prime matter (1:91, 92; AT 11:33, 35). In Aristotelian terms the result is that a substance just consists in a substantial form, in Descartes's own terms, a principal attribute. I think that this is indeed his view, but a full discussion would lead us too far field. (See also Marion 1986: 161–80.)

Thinking Without a Body

Let us now turn to Descartes's defense of dualism. It is worth noting that the Real Distinction Argument was his main, but not his only argument for dualism. In the *Discourse* he argues that language and the wide range of human capacities can't be explained mechanistically and require an immaterial soul (1:139–41; AT 6:55–60). In the *Meditations* he argues that mind and body are distinct on the ground that the mind is indivisible, while body is divisible (2:59; AT 7:85–6). The Real Distinction Argument, however, is his most prominent argument for dualism. In its statement in the *Meditations* this argument has two focal points, one in the Second and the other in the Sixth Meditation. In the Second Meditation Descartes contends that in spite of the doubt raised in the First Meditation about the existence of bodies, he is still certain that he exists and thinks. After eliminating a list of candidates for what he is, on the ground that they don't survive the doubts about bodies, he concludes:

Thought? This I do find: there is thought: this alone cannot be taken away from me. I am, I exist – that is certain. But for how long? For as long as I think. For it could be that if I ceased to have any thought, I would entirely (*totus*) cease to exist. At this point I admit

nothing unless it is necessarily true; I am then, strictly speaking (*praeise tantum*), a thinking thing, that is, a mind, spirit, intellect or reason, words whose meaning was previously unknown to me. (2:18; AT 7:27)

Using the results of the Second Meditation, Descartes claims in the Sixth Meditation that he has a clear and distinct perception of the mind as a thinking, unextended thing. He then employs this perception to show that he, that is, his mind, is a substance different from body:

Since I know that anything that I clearly and distinctly understand can be brought about by God just as I understand it, it is sufficient that I can clearly and distinctly understand one thing without another in order for me to be certain that one is different from the other, since they can be placed apart [*seorsim poni*] at least by God. And it does not matter by what power that happens, in order for them to be regarded as different. Consequently, from the very fact that I know that I exist, and that at the same time I notice nothing else at all to pertain to my nature or essence, except that I am a thinking thing, I conclude correctly that my essence consists in this one thing, that I am a thinking thing. And although perhaps (or rather, as I will soon say, certainly) I have a body, which is very closely joined to me, nevertheless because I have on one hand a clear and distinct idea of myself, insofar as I am only a thinking, not an extended thing, and on the other hand a distinct idea of body insofar as it is only an extended thing, not thinking, it is certain that I am really distinct from my body, and can exist without it. (2:54; AT 7:78)

How does Descartes use the result of the Second Meditation to arrive at dualism? On one very common interpretation the basic idea of the Real Distinction Argument is roughly as follows. In the Second Meditation Descartes finds that it is conceivable that mind can exist without body. He then infers that it is possible for the mind to exist without the body via the premise that whatever is conceivable (clearly and distinctly) is possible. But if mind and body can exist without one another, they must be distinct substances. On this view, the modal claim that the mind can exist without body is central, but as I indicated before, I do not think that it is and will offer an alternative interpretation.

I will analyze the argument as ruling out, one by one, various ways in which mind and body could be the same substance, using the exposition in the *Meditations* as a point of reference: (1) the discussion of the mind in the Second Meditation leads to the conclusion that thought is not a mode of body but a principal attribute; (2) the Real Distinction Argument relies on the claim that extension constitutes the nature of body, and is its principal attribute. Consequently mind and body are not identical by virtue of extension being a mode of thought either. This leaves us with (3) the possibility that mind and body constitute one substance with two principal attributes. For Descartes, this possibility is ruled out because a substance has only one principal attribute. In the present section we will see how Descartes rules out (1). The next section will address (2) and (3).

Among the most important questions about the Real Distinction Argument are the following. What exactly does Descartes think he accomplishes in the thought experiment of the Second Meditation and how does he think he can establish dualism on its basis? In the Sixth Meditation Descartes describes the upshot of the Second Meditation

as follows: “I noticed nothing else to pertain to my nature or essence except that I am a thinking thing – *nihil plane aliud ad naturam sive essentiam meam pertinere animadvertam, praeter hoc solum quod sim res cogitans* (2:54; AT 7:78; see also 2:7, 154; AT 7:8, 219). This phrase could mean either (1) that he did not notice that anything else belongs to his nature or essence, or (2) that he noticed that nothing else belongs to his nature or essence. (For discussion of its ambiguity, see Curley 1978: 196; Kenny 1968: 86ff.) The first of these claims is weaker and easier to establish than the second one. But the question is often raised whether it would be sufficient for establishing dualism. The second claim is strong enough so that dualism would follow quite simply by way of the validation of clear and distinct perceptions, but it is harder to defend, and critics have suggested that the Second Meditation can’t do the job.

In my view Descartes had the weaker claim in mind and the following passage in the Second Meditation is meant to make this clear:

What else am I? I will use my imagination. I am not that complex of limbs, which is called the human body; I am also not some thin air infused in these limbs, nor a wind, fire, vapor, breath, nor anything that I imagine. For I have supposed that those things are nothing. The position remains: I am nevertheless something. Perhaps it happens to be the case, however, that these very things that I suppose to be nothing, because they are unknown to me, do not in reality differ from that I that I know? *I don’t know, I don’t dispute about this yet: I can only judge about those things that are known to me.* (2:18; AT 7:27; emphasis added)

So here Descartes claims that he cannot yet settle the question whether he, that is, his mind, is material. So now the question is whether this weaker claim – he knows that he is a thinking thing, but can’t say yet whether he is also material – is sufficient for Descartes’s argument for dualism. I think it is, provided that we understand him as arguing here that thought is a principal attribute. Let us turn now to his doing so.

In the Fourth Replies Descartes explains that in the Second Meditation he found he can perceive his mind as a complete thing, that is, a substance, and that this is crucial for his argument:

The mind can be perceived distinctly and completely, or sufficiently for it to be regarded as a complete thing, without any of those forms or attributes from which we recognize that body is a substance, as I think I have sufficiently shown in the Second Meditation. (2:157; AT 7:223)

Given that in the Second Meditation Descartes considers the mind only as a *thinking* thing, we can phrase its result as follows: thought is perceived to be sufficient for the mind to be a substance. In terms of Descartes’s theory of substance this means that thought is a principal attribute and not a mode. The thought experiment contributes to this result by showing that thought is not a mode of body. (Descartes sometimes states the point as being that thought does not presuppose *extension*, on account of the fact that he held that extension is the principal attribute of body.)

We can understand why Descartes thinks he achieves this result in light of his conception of the relation between modes and substances: modes can’t be conceived without substances and without the principal attribute they presuppose. In the

Comments on a Certain Broadsheet, a treatise in which he corrects the errors of his follower Regius, Descartes explains his thinking as follows:

it belongs to the nature of a mode that although we can easily understand a substance without it, we cannot, however, *vice versa* clearly understand a mode unless we conceive at the same time a substance of which it is a mode; as I explained at *Principles* I, 61, and as all philosophers agree. It is manifest from his fifth rule, however, that our author [Regius] had not attended to this rule: for there he admits that we can doubt about the existence of body, when we do not at the same time doubt the existence of the mind. Hence it follows that the mind can be understood by us without the body, and that therefore it is not a mode of it. (1:298; AT 8B:350)

So the mind is not a mode of body because we can doubt the existence of body while not doubting, indeed, while being certain of, the existence of mind, and because a mode cannot be clearly understood without conceiving of the kind of substance to which it belongs. (Descartes speaks here of the mind not being a mode of body. The point is really that the Second Meditation is supposed to show that *thought* is not a mode of body.) Descartes allows that we can think of a mode without thinking of its attribute by an abstraction of the mind – in the sense of not thinking of the attribute at all. But when we consider both the mode and its attribute together we will see that the mode depends on that attribute (letter to Gibieuf, January 19, 1642; 3:202; AT 3:474–5; see also 3:188; AT 3:421). So the thought experiment in the Second Meditation results in Descartes seeing that thought is not a mode of extension.

And of course, what is at issue is the question whether we can have *clear and distinct* conceptions of the right kind. If skeptical worries are ignored the philosophical structure of the argument does not include explicit reference to the notion of clear and distinct perception. Nor does it include explicit reference to God, whose role in the argument, in my view, consists in validating clear and distinct perceptions. This view of the role of God is not uncontroversial (see Curley 1978: 198–200; Wagner 1983), but as I see it, Descartes himself describes it this way in the Fourth Replies (2:159; AT 7:226).

We are now in a position to see that the weaker version of the claim “I know nothing else to belong to my nature or essence except that I am a thinking thing” is sufficient for Descartes’s purposes. Since he believes that a mode depends epistemically on its attribute in such a way that one would see the connection between a mode and its attribute when considering them together, the crucial result for the Real Distinction Argument is the relatively weak claim that considering thought and extension together does not force us to ascribe extension to the thinking thing.

The idea that thought is not a mode of extension is by itself not enough to establish that thought is a principal attribute. It could be a mode of some other attribute, or it could be *identical* with extension or some other corporeal quality. Descartes does not pay much attention to this latter possibility; he regarded it as pretty obviously wrong. The remedy, he thought, was to use one’s intellect as opposed to one’s imagination; he did not think an *argument* was needed, but rather the withdrawal from sense, where this includes a withdrawal from imagination and limiting oneself to just using one’s pure intellect (2:297; AT 7:441; 2:287; AT 7:425). Descartes saw himself as giving an *argument* only against the error of ascribing both thought and motion to the same thing

(2:285; AT 7:422–3). In other words, he is focused on arguing for substance dualism rather than property dualism. I must confess to some sympathy with this approach if one grants him his relatively simple mechanistic conception of body. Even if thought is corporeal, it does not seem likely that it is identical with extension or the motion of bits of Cartesian extended matter. Surely many cases of non-identity strike us as obvious without making us feel the need for an argument. To take an extreme example, consider the non-identity of the number 7 and a piece of wax. In the sequel I will take for granted Descartes's assumption that the idea that thought is a principal attribute includes its non-identity with extension.

The possibility that thought presupposes some other property as a principal attribute calls for more discussion. This possibility does not necessarily threaten the attempt to show that the mind is an incorporeal substance. For if thought were a mode of some other property which is, however, a principal attribute distinct and independent from extension, then the intended conclusion could still be established. This objection would pose a problem if either (a) thought were a mode of some other *corporeal* property, or (b) thought were a mode of some property that is presupposed by *both* thought and extension. So what could he say to rule out these possibilities?

Descartes may have thought that the strategy of the Second Meditation is sufficient to rule out (a): if one can conceive of oneself as a thinking thing without attributing to oneself any corporeal characteristics, that could, given Descartes's mode-attribute conception of substance, be enough to get to the conclusion that thinking does not presuppose corporeity in the relevant sense. And it is plausible to suppose that he meant the Second Meditation to deal with any corporeal features. A critic may object that the Second Meditation doing so assumes exhaustive knowledge of the nature of the corporeal on the part of the meditator. Given the amazing developments in the conception of body over the course of the history of philosophy, that attitude may well strike one as rather optimistic. Not much later, philosophers and scientists included notions of force that by Descartes's lights were confusions of the mental and the physical. Indeed, given that Descartes thought of himself as changing the notion of body, he might have considered the possibility of corporeal qualities unknown to him.

What about (b), the possibility that there is some other property that is presupposed by both thought and extension? Descartes neglects this possibility, but he may well have believed that considering thought and extension together can rule it out as well. In a passage in the Third Replies he suggests that if one considers modes that presuppose the same attribute together, one will see that they have this attribute in common. He claims that when we consider the various modes of mind together we see they have thought in common, and similarly for the modes of body. And Descartes claims that we see no connection between thought and extension (2:124; AT 7:176; see also the Sixth Replies, 2:285–6; AT 7:423–4).

This reply may well leave a critic unsatisfied. One worry is that this strategy assumes again that we are familiar with all the possible relevant qualities. But there may well be qualities unknown to us such that if we considered them together with thought and extension we'd see the connection. We might find that we can conceive of ourselves as non-physical, thinking things in spite of considering the question whether all physical qualities we are aware of must pertain to us or whether thinking and these physical

qualities presuppose some common attribute. But what if there are physical qualities we are unaware of?

A different difficulty is this: can we establish that thought does not presuppose extension, or some other quality, by virtue of any *a priori* procedure? The mode-attribute relation might not always be detectable *a priori*, even if we are aware of all the relevant qualities. This is a serious problem for the argument. Indeed, questions about how much one can establish in this *a priori* fashion about the nature of thought is central to the success of Descartes's argument for dualism on any interpretation of this argument. For instance, even in the absence of an *a priori* connection between thought and corporeity, it might well be that thought is identical with or intrinsically dependent on corporeal processes.

This problem arises in particular when one accepts the view that there are necessary truths that are not *a priori*. (For relevant discussion, see Kripke 1972; Shoemaker 1983.) But it is important to note that on my interpretation, this view, by itself, does not necessarily pose a problem. I have explained Descartes's reliance on *a priori* considerations in terms of a specific view he holds, his mode-attribute conception of substance. This explanation is compatible with there being *a posteriori* necessary truths about matters other than the mode-attribute relation. So the mere existence in general of necessary *a posteriori* truths does not entail that the thought experiment cannot provide Descartes with what he needs.

Furthermore, it might be that there is an *a priori* connection between thought and materiality, but it is not detectable by the kind of procedure followed in the Second Meditation – it might be much harder to detect. (Arnauld raises this kind of problem in the Fourth Objections, 2:141–3; AT 7:201–4; for Descartes's response, see 2:157–9; AT 7:223–5). Again, Descartes's specific view about the nature of the relationship between mode and attribute explains why he thinks his procedure is adequate. So a critic specifically needs to address this view. The view is plausible for various examples of modes found in his writings, such as motion, shape, sensation, and imagination, but it does seem like a very strong view about the general relationship between the essence of a substance and its modes.

Principal Attributes and the Nature of Body

How close are we to the conclusion that mind and body are actually different substances? We have seen how one form of denying dualism is ruled out: the possibility of thought being a mode of body. But thought being a principal attribute is not enough to establish that the mind is not actually extended. If my mind is a thinking, complete thing by virtue of the attribute of thought, it follows that it is possible for my mind to exist as just a thinking thing that is not extended. But that conclusion is compatible with the idea that it is actually extended. The argument proceeds by ruling out two further non-dualistic positions: (2) the possibility that extension is a mode of thought and (3) the possibility that there is one substance with two principal attributes, thought and extension. Descartes relies on two further premises: extension is the principal attribute of body, and each substance has exactly one principal attribute.

It is easy to overlook the importance of the idea that extension is a principal attribute, and generally discussions of the argument focus on the mind without paying attention to body. But Descartes's conception of body is crucial, and he himself saw it that way. The claim that extension is the principal attribute of body is essential in two ways. First, *extension* rather than some other property is the principal attribute of body. Descartes thought that existing views of body, in particular the Aristotelian Scholastic one, were confused about what belongs to body and what belongs to the soul. He saw himself as cleaning up this type of confusion, in particular in his critique of the Scholastic notions of real qualities and substantial forms. Once we clean up the notions of body and soul, and we think of body as what is extended, and of the soul as what thinks, he contends, we can easily see they are different:

When things are separated only by a mental abstraction, one necessarily notices their conjunction and union when one considers them together. But one could not notice any between the body and soul, provided that one conceives them as one should, the one as that which fills space, the other as that which thinks. (Letter of July 1641, possibly to de Launay, 3:188; AT 3:420–1)

So while discussions of Descartes's argument for dualism tend to neglect the importance of his conception of body, he himself thought it was crucial. And indeed, one's conception of body is important to how one draws the divide between the mental and the physical, and to the question how one might approach the question of dualism. Given the radical changes the notion of body has undergone over the course of the history of philosophy and natural science, any treatment of the mind-body problem is likely to be affected by views of the nature of body current at the time, views that may well change.

Second, it is crucial to Descartes's argument that body has a *principal attribute* different from thought. That is to say, it is important that body is a substance by virtue of some property different from thought, and does not have to think in order to be a substance. Descartes takes this idea to be pretty obvious, and it will surely strike most people this way. One can easily conceive of a corporeal, non-thinking complete thing such as a stone, and we easily grant that there are such things. But it is worth noting that Leibniz, for instance, disagreed: for him, all substances are perceiving substances and Cartesian extended bodies are not real substances. In Cartesian terms, Leibniz did not regard extension, but only perception, as a principal attribute.

At this stage of the argument we are supposed to be convinced that both thought and extension are principal attributes. Consequently, two ways in which the mind might be a body are ruled out: thought cannot be a mode of extension, and extension cannot be a mode of thought. What is left is the possibility of a substance that has two principal attributes, thought and extension. This possibility is eliminated by what I will call the Attribute Premise, which states that each substance has exactly one principal attribute.

We have already come across this premise in Descartes's account of substance at *Principles* 1.53, where he writes that each substance has one principal attribute that constitutes its nature or essence. The premise is generally not at all explicit when he argues for the real distinction of mind and body, but he does appeal to it in the *Comments*

on a *Certain Broadsheet*. Regius had written: "since those attributes [extension and thought] are not opposites but diverse, there is no obstacle to the mind being some attribute belonging to the same subject as extension, although one is not comprehended in the concept of the other" (1:294–5; AT 8B:343). Descartes responds that this is possible for modes, but he rejects it for principal attributes:

About other attributes that constitute the natures of things it cannot be said that those that are different and of which neither is contained in the concept of the other belong to the same subject. For it is the same as saying that one and the same subject has two different natures, which implies a contradiction, at least when the question concerns a simple and non-composite subject, as is the case here. (1:298; AT 8B:349–50)

Scholars have overlooked the role of the Attribute Premise, which is no doubt due to the fact that Descartes does not make it explicit in his discussions of the Real Distinction Argument. Indeed, he himself may not always have appreciated its importance. Nevertheless the reasons for thinking that the argument does rely on it are very strong indeed. Descartes clearly accepted the premise, as *Principles* 1.53 makes clear, and in the *Comments* he does explicitly ascribe a role to the premise in his defense of dualism. Furthermore, philosophically speaking the argument requires *something* to do the work the premise does. Without it the argument establishes the possibility of a thinking, non-extended substance. But it does not rule out for any particular thinking substance – such as my mind or Descartes's, or for that matter, human minds in general – that it is in fact extended and corporeal. (I am leaving open the possibility of a *composite* substance that consists of a combination of a thinking and an extended substance – although in my view Descartes did not accept this possibility. In the above passage Descartes himself refers to composite *subjects*. The present point is that he holds that mind and body are each a different substance whether or not in addition the composite of the two is again a substance.)

But why did Descartes hold the Attribute Premise? The closest he comes to a defense of the premise is in the *Comments*: he says that a substance cannot have two natures, because this would imply a contradiction. This does not teach us much. One possible explanation is this. We saw that Descartes identified substance and principal attribute. A substance contains nothing over and above its principal attribute; there are no additional constituents. But now it might simply follow that where there are two such attributes there must be two substances. By contrast, on the Bare Subject View two attributes could be accommodated within one (simple) substance because one could say they both inhere in this one subject. Indeed, when Descartes makes explicit in the *Comments on a Certain Broadsheet* that a (simple) substance can only have one principal attribute, his identification of substance and attribute is prominent.

A different explanation is suggested by Descartes's view that a principal attribute determines what kinds of properties, or modes, a substance has. In this regard a Cartesian principal attribute is like a Scholastic substantial form, as well as like the atomic structure of gold, which determines the properties of gold and how gold behaves. The properties of a substance are *unified* by this attribute, which accords with the idea, common in the history of philosophy, that a substance is a unity in a strong sense: the

principal attribute generates a qualitative unity. This picture presupposes that a substance only has one such attribute. I suspect that this is the idea Descartes refers to when he claims that a substance cannot have more than one nature. Indeed, I suspect that for many philosophers in this period it went without saying that a substance has one single unified essence. To put the question differently: if one accepts that something can be just a thinking substance, what would count as taking it to be sometimes as also an extended one? (See Schiffer 1976: 36–7; for a different but related point, see Van Cleve 1983: 43.)

One may reject Descartes's use of the Attribute Premise in various ways. Thus one may reject the premise and contest the idea that a substance has one single nature. Locke's position may exemplify this attitude. He accepted the view that there is a great disparity between the mental and the physical, but held that God could have added thought to matter (Locke 1975: 2.23.32; 4.3.6). Alternatively, one may accept the premise but reject Descartes's argument that thought and extension are two natures. We have already discussed the possibility that he was wrong in thinking that natures can be identified on the basis of the kind of conceptual independence he saw as a reliable test. One could contend that in fact thought must inhere in an extended thing and thought and extension are united in one nature. Or one could contend that *human* thought presupposes a body and is part of a broader human nature; indeed, the Aristotelian Scholastics held a version of this last view. For them, human intellectual activity, but not angelic or divine intellectual activity, depends on sensation and imagination, which for them were functions of a living organism.

We have now a complete analysis of the argument and are in a position to schematize it as follows:

- 1 I can doubt that I am extended, but I cannot doubt (that is, I am certain) that I think.
- 2 For any (intrinsic) properties ψ and ϕ , if it is possible to doubt that something is ϕ while not doubting (that is, while being certain) that it is ψ , then ψ is not a mode of ϕ .
- 3 Thought is not a mode of extension. (1, 2)
- 4 Extension is the principal attribute of body, that is, corporeal substance.
- 5 If thought is not a mode of extension, it is a principal attribute distinct from extension.
- 6 Thought is a principal attribute distinct from extension. (3, 5)
- 7 Every (simple) substance has exactly one principal attribute.
- 8 The substance that is the subject of my thoughts (= my mind) is not extended. (4, 6, 7)
- 9 My mind is a different substance from body. (4, 8, Leibniz's Law)
- 10 If A and B are different substances, they are really distinct.
- 11 My mind is really distinct from body. (9, 10)

To highlight the significant moves: (1) states the result of the thought experiment of the Second Meditation, which for Descartes led to the conclusion that thought is a principal attribute by way of his view of the relation between modes and attributes, which is stated at (2). Extension too is a principal attribute (6) and so when combined

with the Attribute Premise (7) the argument arrives at the real distinction of mind and body by virtue of some further basic premises.

Conclusion

I began this chapter by explaining how Descartes's conception of the mind was a major departure from Aristotelian Scholasticism in its inclusion of states other than intellectual ones, such as sensation and imagination, which the Aristotelians regarded as states of an ensouled body. In this sense it is Descartes's conception of the mind that underlies modern philosophy of mind. At the same time, there is an element of continuity with the Aristotelian tradition in his treatment of the various types of mental states: non-intellectual states are, as it were, on the margins of the mind for Descartes in a way they often have not been for later philosophers. This is important to a proper understanding of the Real Distinction Argument. Contemporary discussions of the mind-body problem focus on sensory states, such as feelings of pain, experiences of color, which are regarded as raising particularly difficult questions for materialism. It is tempting to see the Real Distinction Argument in light of this focus. And Descartes's principal argument for dualism is often regarded as based on a conception of thought in his broad sense, as including intellection, sensation, imagination. But in fact this argument only relies on his conception of intellectual activity. This is strongly suggested by his remarks right *after* the conclusion of the argument in the Sixth Meditation:

Moreover, I find in me faculties for certain special modes of thinking, namely the faculties of imagining and sensing. I can clearly and distinctly understand myself as a whole without them; but not *vice versa* them without me, that is, without an intelligent substance in which they are. For they include some intellection in their formal concept: hence I perceive that they are distinguished from me as modes from a thing. (2:54; AT 7:78)

So he introduces sensation and imagination as modes of the mind *after* he concludes the argument. And the argument was based on a conception of the mind's essence, which Descartes here presents as intellectual: sensation and imagination include intellection, and that is why they pertain to the mind. Indeed, he repeatedly suggests that focus on sensation brings out the union of mind and body rather than their distinction (2:56, 160; AT 7:81, 228–9). He describes sensations as modes of the mind as united to the body rather than modes of the pure mind (3:203; AT 3:479; 3:206; 3:493). And he writes that in intellection, but not in imagination and sense perception, the mind operates independently of the body (2:248; AT 7:358). Consequently, Descartes sees an important difference between the different types of thought in their relation to the body, a difference that fits his reliance on the nature of the intellect alone in arguing for dualism.

So in its focus on the intellect Descartes's argument for dualism is closer to Aquinas's argument for the status of the soul as a subsistent incorporeal entity than to the modern problem of consciousness with its focus on sensory states. As did Aquinas and other Aristotelians, Descartes argues for the immateriality of the soul based on considerations

about the intellect rather than the senses. And while Descartes makes sensation and imagination modes of the mind, but with a special dependence on body, later early moderns did not make this distinction between intellectual and other mental states. Thus Spinoza and Leibniz maintained a complete parallelism between the mental and the physical (for more discussion, see Carriero 1986; Wilson 1978; Rozemond 1998: ch. 2). In this regard then it is best to see Descartes as a transitional figure, who retains an element of continuity with the Aristotelians, while preparing the way for the view that all thoughts in his broad sense are mental modes on a par.

I have offered an interpretation of the Real Distinction Argument in which it relies heavily on Descartes's conception of substance. The argument relies on the idea that modes presuppose principal attributes ontologically and epistemically in such a way that the thought experiment of the Second Meditation can reveal that thought is not a mode of body. And it relies on his Attribute Premise. This interpretation may well seem to remove it quite far from contemporary concerns with the mind-body problem. One reason is that for some Descartes's argument may seem most obviously germane to present day concerns insofar as it raises the question of property dualism: how can we determine whether mental states are identical (in some sense) with physical states? I have argued that Descartes was more focused on establishing substance dualism. He thought that using one's pure intellect, as the *Meditations* are supposed to get us to do, would lead one quickly to see that property dualism is true. It does not follow, however, that using something like his Second Meditation procedure could not be relevant to a more ambitious treatment of property dualism. The question raised by this procedure is whether we can arrive at property dualism *a priori* in the manner of Descartes's Second Meditation. But given his interest in substance dualism, his argument does at least as much to raise a question less often considered, even if we may not wish to adopt his theory of substance to pursue it: What would it be for radically different types of qualities, in the sense in which for Descartes – and still many philosophers today – mental and physical qualities are, to belong to the same individual thing (see Schiffer 1976: 36–7)? Does it make sense to think of mind and body as one thing?

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Chapter 23

The Union and Interaction of Mind and Body

PAUL HOFFMAN

Descartes is often portrayed as a villain in the history of western thought on the grounds that his dualism of mind and body – his view that thinking things and extended things are really distinct substances – sent philosophy on the wrong path. The leading objection to Cartesian dualism is that once having distinguished mind and body as really distinct substances, it is impossible to provide a satisfactory account of their connection. This problem of the connection or union of mind and body is often construed to be one of explaining how mind and body causally interact, that is, how thoughts in the mind produce motions in the body and how motions in the body produce sensations, appetites, and emotions in the mind. As Anthony Kenny says:

These remarks make clear *that* soul and body are connected and *why* they should be connected as they are, but they do not explain *how* they are connected. On Descartes's principles it is difficult to see how an unextended thinking substance can cause motion in an extended unthinking substance and how the extended unthinking substance can cause sensations in the unextended thinking substance. (Kenny 1968: 222–3)

However, the very passage that Kenny cites from the Sixth Meditation suggests on the contrary that the union of mind and body is metaphysically more fundamental than their interaction and is meant to account for it:

these sensations of hunger, thirst, pain and so on are nothing but confused modes of thinking which arise from the union, and, as it were, intermingling of the mind with the body. (2:56; AT 7:81)

Moreover, it has seemed to me that the notion of the union of mind and body has another equally important, if not more important, explanatory role for Descartes, namely, that of explaining why the product of the union of mind and body, the human being, should be considered a genuine unity or an *ens per se*, that is, a substance and not a mere aggregate or heap.¹ Thus there are really three different problems that go under the name of the union of mind and body. One is that of the interaction of mind and body. The second is that of the relation between mind and body. The third is that of the unity of the composite. Until recently this last problem was not taken seriously

by English-speaking commentators. French commentators have tended to take the issue more seriously, but with the exception of Genevieve Rodis-Lewis, they have not been very sympathetic to Descartes (Rodis-Lewis 1950: 76ff.).

It is my controversial contention that Descartes's solutions to these three problems of the union of mind and body are based on his retention of two fundamental Aristotelian metaphysical doctrines. The first doctrine is that of *hylomorphism*: that mind and body are related as form to matter and that the composite human being that results is itself a substance. The second doctrine is the *identity of action and passion*: that whenever a causal agent acts on something (referred to as the patient), what the agent does (the action) and what the patient undergoes (the passion) are one and the same. While the first Aristotelian doctrine is familiar to most contemporary philosophers, the second, basic to the Aristotelian account of causation, is scarcely known or discussed.

Descartes's Hylomorphism

The view that Descartes endorses hylomorphism is a form of what is sometimes called Cartesian trialism. But we must be careful, because one can distinguish two versions of trialism, and hylomorphism commits us to only one. According to the weak version, Descartes is a trialist because he thinks that minds, bodies, and human beings are all substances. Hylomorphism falls under this first version (but one could endorse this version – one could assert that the human being is a substance – without endorsing the hylomorphic account of the union of mind and body). According to the strong version, Descartes is a trialist because he thinks there are three ultimate classes of created substances: minds, bodies, and human beings, each with its own distinctive principal attribute. One can be a weak trialist without being a strong trialist. So one might argue that the human being is a substance, but deny that it has its own distinctive attribute. Instead, minds (thinking things) and bodies (extended things) are the only two ultimate classes of created substances, and human beings are constructed out of them.

Someone who endorses the weak version of trialism might be led to endorse the strong version by the following considerations. In the *Principles* Descartes asserts that each substance has one principal property that constitutes its nature and essence, which strongly suggests that if the human being is a substance it must have a distinctive attribute (1:210; AT 8A:25). And there is a passage from his correspondence with Princess Elizabeth which has been taken to suggest that Descartes recognizes three basic attributes – that in addition to extension and thought he also recognizes a third attribute which is their union.

First I consider that there are in us certain primitive notions which are as it were the patterns on the basis of which we form all our other conceptions. There are very few such notions. First, there are the most general – those of being, number, duration, etc. – which apply to everything we can conceive. Then, as regards body in particular, we have only the notion of extension, which entails the notions of shape and motion; and as regards the soul on its own, we have only the notion of thought, which includes the perceptions of the intellect and the inclinations of the will. Lastly, as regards the soul and the body together,

we have only the notion of their union, on which depends our notion of the soul's power to move the body, and the body's power to act on the soul and cause its sensations and passions. (3:218; AT 3:665)

It is important that Descartes is endorsing the notion of the union of mind and body as something primitive, that is, not subject to further analysis, but it seems implausible to read him as suggesting here that the union of mind and body should be considered to be an attribute, that is, something constituting the nature or essence of a substance. Instead, he is just indicating that the relation between mind and body is something primitive and unanalyzable, which echoes an earlier remark to Regius:

You must profess that you believe . . . that mind is really and substantially united to body, not by position or disposition, as you say in your last paper – for this too is open to objection, and, in my opinion, quite untrue – but by a true mode of union, such as everyone openly allows, even if no one explains what sort it is, and so you also are not obligated to do so. (3:206; AT 3:493)

Since the union that the others “openly allow” is the relation between mind and body construed as the relation between form and matter, I read Descartes as making the good philosophical point, reflected in the letter to Elizabeth, that the relation between form and matter is a primitive and unanalyzable notion. Form is said to inform or inhere in matter, and this relation creates a closer bond than that of mere disposition or position, but there is no further analysis or account to be given of this relation.

What is the evidence that Descartes endorses a hylomorphic account of the human being?

- 1 In his January 1642 letter to Regius he asserts that the human soul “is the true substantial form of man” (3:208; AT 3:505).
- 2 In that same letter to Regius he asserts that the human soul is “recognized to be the only substantial form, whereas the rest [of the so-called substantial forms] are composed of the configuration and motion of parts [of matter]” (3:207; AT 3:503).
- 3 In the *Rules* he asserts that the body is informed by the human mind (1:40; AT 10:411).
- 4 In the *Principles* he asserts that the human soul informs the whole body (1:279; AT 8A:315).
- 5 In the Fifth Replies he notes that people have used the term “soul” to refer both to the principle by which we are nourished and grow and the principle by which we think; and he asserts that “as it is taken specially as the ‘first actuality’ or ‘principal form of man’ it must be understood to refer only to the principle by which we think, which as much as possible I have called ‘mind’ in order to avoid ambiguity” (2:246; AT 7:356).

The next three passages require explanation. In these passages Descartes is alluding to and endorsing the Scholastic view that the mind or soul exists whole in the whole body and whole in each of its parts. Since that view is part and parcel of the Scholastic hylomorphic conception of the relation between the soul and the body, Descartes's

endorsement of it counts as significant evidence that he endorses a hylomorphic conception of the human being.²

- 6 In the *Passions of the Soul* he asserts that “we need to recognize that the soul is truly joined to the whole body and that one cannot properly say that it is in any one of its parts to the exclusion of the others” (1:339; AT 11:351).
- 7 In the Sixth Meditation he asserts that “although the whole mind seems to be united to the whole body, I recognize that if a foot or arm or any other part of the body is cut off, nothing has thereby been taken away from the mind” (2:59; AT 7:86).
- 8 In the Sixth Replies he asserts that the way he understands the mind to be coextensive with the body is that it is “whole in whole and whole in any of its parts” (2:298; AT 7:442).

This is a considerable body of textual evidence, enough to shift the burden of proof to the opponents of the hylomorphic interpretation, especially since there are no passages standing in direct opposition. That is, there are no passages in which Descartes denies that the soul is the substantial form of the body, denies that the soul informs the whole body, or denies that the soul exists whole in the whole body and whole in its parts. To refute the hylomorphic interpretation, one has to make the case that he was being disingenuous in all these passages. Such a charge of disingenuousness can be made to stick only if there is compelling evidence that he has other more fundamental commitments that are inconsistent with his explicit endorsement of hylomorphism.

Some commentators have tended to discount the remarks to Regius on the grounds that he was merely advising Regius to say things that would avoid further controversy with the authorities at the University of Utrecht. However, since much of his advice to Regius concerning the closely related issue of whether the human being is an *ens per se* is a close paraphrase of parts of his Fourth Replies (to Arnauld’s objections) written around the same time, that particular argument for disingenuousness is weakened considerably. Descartes’s replies to Arnauld’s objections have always been considered to be the most significant of his replies, even if commentators have tended to overlook its implications for his understanding of substance, to be discussed more fully below.

Opponents of the hylomorphic interpretation have pointed to four fundamental commitments that they claim are inconsistent with hylomorphism.

First, some commentators who (like me) deny that the union counts as a principal attribute cite the *Principles* passage where Descartes asserts that each substance has one principal property which constitutes its nature and essence as providing conclusive evidence that he does not consider the human being to be a substance. And all parties agree that a hylomorphic account of the union of mind and body entails that the human being is a substance. My response to this objection continues to be that the *Principles* passage is superseded by Descartes’s more complete discussion in the later *Comments on a Certain Broadsheet*:

As for the attributes which constitute the natures of things, it cannot be said that those which are different, and such that the concept of the one is not contained in the concept of the other, are present together in one and the same subject; for that would be equivalent

to saying that one and the same subject has two different natures – a statement that implies a contradiction, at least when it is a question of a simple subject (as in the present case) rather than a composite one. (1:298; AT 8B:349–50)

Here Descartes reveals that his true position is more nuanced than the one set out in the *Principles*. He believes that even a simple subject can have two or more attributes of the sort that constitute the natures of things, provided neither can be conceived independently of each other. Moreover, he thinks it is not contradictory that a composite subject, such as a human being, should have two attributes that can be conceived independently of each other. Commentators who take the *Principles* passage as the key text for understanding Cartesian dualism have tried to discount this passage by arguing that since Descartes only refers to composite subjects, not to composite substances, it cannot justifiably be inferred that he thinks there are composite substances. I do not find this strategy credible. It seems uncharitable to read Descartes as introducing a new kind of subject of attributes (of the sort that constitute the nature of things) that is something other than a substance without telling us what kind of thing it is.

Vere Chappell has objected to my interpretation of the *Comments* passage by claiming that Descartes is not in fact endorsing the view that a simple substance can have more than one attribute if one is conceived through the other. He notes that earlier in the same paragraph Descartes asserts that there is a contradiction in saying that principal attributes are different but not opposites, offering as a justification that there is no greater opposition between principal attributes than their being different:

He adds ‘these attributes are not opposites, but merely different’. Again, there is a contradiction in this statement. For, when the question concerns attributes which constitute the essence of some substances, there can be no greater opposition between them than the fact that they are different; and when he acknowledges that the one attribute is different from the other, this is tantamount to saying that the one attribute is not the other; but ‘is’ and ‘is not’ are contraries. (1:298; AT 8B:349)

Chappell interprets this to mean that Descartes is inflating the difference between principal attributes to amount to opposition, so that if principal attributes are different then they are contraries, which would imply that it is a contradiction for them to exist in one and the same subject.

I read Descartes as, on the contrary, deflating opposition between principal attributes to mere difference. On my interpretation, the route to the contradiction is more involved: if principal attribute A is different from principal attribute B and neither attribute is contained in the other, then it follows that a subject containing both A and B has two natures or essences; but it is a contradiction that a simple substance should have more than one nature or essence. Descartes is allowing that a substance with two different (i.e., non-identical) principal attributes would not have two essences provided the concept of one was contained in the concept of the other. I believe that some medievals would have wanted to say that God provides an example of such attributes whose concepts are not independent but distinct only by reason: God has more than one principal attribute, but God has only one essence.³

I would argue that while both readings of the passage have a certain plausibility, mine fits more closely to the text. Chappell’s reading requires reinterpretation of two

key clauses. First, he tells us that when Descartes says one attribute is not the other, what he really means is that one *is a contrary of* the other. Second, he tells us that when Descartes says that “As for the attributes which constitute the natures of things, it cannot be said that those which are different, and such that the concept of the one is not contained in the concept of the other” (*quae sunt diversa, & quorum neutrum in alterius conceptu continetur*) what he really means is “As for the attributes which constitute the natures of things, it cannot be said that those which are different, *in that* the concept of the one is not contained in the concept of the other.” That is, Chappell is arguing that we should take the final clause to be in apposition with the preceding one rather than, as it is naturally read, to introduce a further restriction. My reading does not require any such reinterpretations.

To ascribe to Descartes the view that the human being is a composite substance having two essences each of which can be clearly and distinctly conceived apart from each other might seem equally incompatible with ascribing to him a hylomorphic conception of a human being. For it might be claimed that hylomorphism requires that a human being have only one essence. However, I believe that this is mistaken as a general thesis about hylomorphism. While it is true that Aquinas held this, in fact other prominent Scholastics, for example, Scotus and Ockham, argued that a human being required more than one substantial form, including the form of corporeity, the sensitive soul, and the intellective soul, and moreover, they held that these substantial forms were really distinct from one another.

Marleen Rozemond has argued that this defense of the hylomorphic interpretation of Descartes is inadequate because Ockham and Scotus made use of an additional resource lacking in Descartes to account for the unity of a substance with multiple forms, namely, the notion of the forms being subordinated to one another and thereby constituting a hierarchy (Rozemond 1998: 145). I concede that Descartes never does mention this idea of a hierarchy of the constituent elements of a composite substance, but he does make use of a very similar notion that I believe will suffice, namely, that of one element of a composite subject being the principal element, in relation to which the others, even though substances, can be regarded as modes (1:299; AT 8B:351).

Second, commentators have objected that Descartes's denial that the soul is the principle or source of life is inconsistent with a hylomorphic conception of the relation between soul and body. It is certainly true that one of the major differences between Descartes and his Aristotelian predecessors is that he thought that life could be explained mechanistically through extension alone and that therefore the soul is not required as the principle of life. But as the fifth passage above from the Fifth Replies shows, Descartes thought this was no barrier to considering the soul, understood to be nothing other than the principle by which we think, to be the principal form of the human being. Descartes is correct to claim that these two roles traditionally attributed to the soul – that of being the principal form of the human being and that of being the principle of life – are logically distinct. Forms in general are not sources of life, otherwise there could be no hylomorphic account of inanimate things such as a bronze sphere or fire.

Third, commentators have objected that Descartes's watch analogy in the *Passions of the Soul* shows that he cannot be seriously committed to hylomorphism:

So as to avoid this error, let us note that death never occurs through the absence of the soul, but only because one of the principal parts of the body decays. And let us recognize that the difference between the body of a living man and that of a dead man is just like the difference between, on the one hand, a watch or other automaton (that is, a self-moving machine) when it is wound up and contains in itself the corporeal principle of the movements for which it is designed, together with everything else required for its operation; and, on the other hand, the same watch or machine when it is broken and the principle of its movement ceases to act. (1:329–30; AT 11:330–1)

It is argued by Robert Pasnau that this passage shows that Descartes does not really take seriously his claim in a letter to Mesland that the identity of the human body depends on its relation to the soul:

First of all, I consider what exactly is the body of a man, and I find that this word 'body' is very ambiguous. When we speak of a body in general, we mean a determinate part of matter, a part of the quantity of which the universe is composed. In this sense, if the smallest amount of that quantity were removed, we would judge without more ado that the body was smaller and no longer complete; and if any particle of the matter were changed, we would at once think that the body was no longer quite the same, no longer *numerically the same*. But when we speak of the body of a man, we do not mean a determinate part of matter, or one that has a determinate size; we mean simply the whole of the matter which is united with the soul of that man. And so, even though that matter changes, and its quantity increases or decreases, we still believe that it is the same body, *numerically the same* body, so long as it remains joined and substantially united with the same soul. (3:242–3; AT 4:166)

This objection is significant because it is a crucial element of the hylomorphic account of the relation between soul and body that the soul actualize the body in some suitably robust sense. If the identity of the human body is determined by its being united to the soul as asserted in the Mesland letter, then there is a suitably powerful sense in which the mind does actualize the body. But if that letter is discounted, then there does not seem to be any suitably powerful sense in which the mind actualizes the body.

The reason given for holding that the watch analogy is inconsistent with the Mesland letter is that he should not allow that the broken watch is identical to the working watch if their relation is similar to that between the body of a living man and a dead man, since the Mesland letter entails that the body of a living man and that of a dead man are not identical. The first thing to note in response to this objection is that Descartes's scholastic predecessors who endorsed the hylomorphic conception of the human being were in disagreement whether the corpse was identical with the living human body. Aquinas argued that it was not, Scotus and Ockham argued that it was. Indeed, the claim that it must be identical in order to explain why it has the accidental features it has, such as its color and shape, was the source of one of their arguments for attributing a distinct form of corporeity to human beings. So there is nothing anti-hylomorphic in Descartes's endorsing the view that the body of the living man is identical with the body of the dead man. Moreover, there are at least two ways to reconcile his watch analogy with his account of the identity of the human body in the Mesland

letter. First, one might read him not to be asserting in the watch analogy that the human body is identical with the corpse, but rather to be asserting that the determinate part of matter that constitutes the living human body before death can be identical with the determinate part of matter that constitutes the corpse. According to Descartes, a determinate part of matter remains numerically the same provided it consists of exactly the same particles. The body of the dead man could, at least for a short time, be constituted by the same determinate part of matter that constituted the body of the living man, and so it could be the same body in that sense of the term “body.” Second, one could argue that Descartes’s primary aim in the Mesland letter was to explain how numerically distinct determinate parts of matter could count as numerically the same human body. There is nothing inconsistent with the Mesland letter in his maintaining that a given determinate part of matter remains numerically the same human body so long as that determinate part exists, even if it has ceased to be united to the soul. This would still allow for the claim that the soul actualizes the body in a robust sense – what makes a determinate part of matter into a human body is the fact that it is or was united to the soul.

Fourth, commentators have objected that in asserting as he does that mind and body are substances, *entia per se*, or complete things considered in themselves, Descartes cannot then construct another substance, complete thing, or *ens per se* out of them. It is basic to the hylomorphic conception that the constituents of a substance cannot themselves be substances. The composite consisting of substance and something else will always be an *ens per accidens*.

To respond to his objection let me spotlight a significant oversight in Cartesian scholarship on this general topic. Commentators have simply failed to recognize that Descartes’s conception of what it is to be a created substance is very weak, much weaker than that of his Aristotelian predecessors. No Aristotelian would have granted that a hand is a substance, but some of them, most notably Aquinas, did grant that there was a weak sense of what it is to be a complete thing or an *ens per se* according to which a hand can be considered to be a complete thing or an *ens per se*. When Descartes asserts that mind and body are substances or complete things, he means it only in that weak sense in which Aquinas allowed that a hand is a complete thing or *ens per se*. The crucial passage is from the Fourth Replies (to Arnauld’s objections):

I am not unaware that some substances are commonly called ‘incomplete’. But if they are said to be incomplete because they cannot exist *per se* alone, I confess that it seems contradictory to me that they should be substances, that is, things subsisting *per se* and at the same time incomplete, that is, unable to subsist *per se*. But in another sense they can be said to be incomplete substances, namely such that insofar as they are substances, they have nothing incomplete, but only insofar as they are referred to some other substance, with which they compose something one *per se*.

Thus a hand is an incomplete substance when it is referred to the whole body of which it is a part; but it is a complete substance when it is considered alone. And in just the same way mind and body are incomplete substances when they are referred to the man which they compose; but, considered alone, they are complete. (2:156–7; AT 7:222)

Anything that can exist apart from a subject is going to count for Descartes as an *ens per se* or substance; and this is the basis of his argument that the Scholastic notion of a real accident is contradictory:

Secondly, it is completely contradictory that there should be real accidents, since whatever is real can exist separately from any other subject; yet anything that can exist separately in this way is a substance, not an accident. The claim that real accidents cannot be separated from their subjects 'naturally', but only by the power of God, is irrelevant. For to occur 'naturally' is nothing other than to occur through the ordinary power of God, which in no way differs from his extraordinary power – the effect on the real world is exactly the same. Hence if everything which can naturally exist without a subject is a substance, anything that can exist without a substance even through the power of God, however extraordinary, should also be termed a substance. (2:293; AT 7:434–5)

Thus Descartes is not committed to the view that mind and body are substances or *entia per se* in the stronger sense in which the Aristotelians considered a human being to be a substance. An Aristotelian human being is not incomplete in relation to anything else, but the Cartesian mind and human body are incomplete in relation to the human being. Since the mind and body are *entia per se* only in the weak sense of being capable of existing apart from a substance, they are the sorts of things that Aristotelians considered eligible to be constituents of substances.

Marleen Rozemond has objected that these considerations are not sufficient to show that Descartes holds a hylomorphic conception of the relation between mind and body. She maintains that Scholastics required further that the constituents of substance be incomplete according to their essence and that they have a natural aptitude to be united to each other. In an earlier paper I made a twofold response (see Hoffman 1999). First, I argued that Descartes should be translated in his December 1641 letter to Regius as advising him to say that he had shown that body and soul, *by their very nature*, are incomplete substances (*dixisti animam & corpus, ratione ipsius, esse substantias incompletas*) (3:200; AT 3:460). I am now convinced of the correctness of the standard translation according to which he is advising Regius to say that he had shown that body and soul, *in relation to the man*, are incomplete substances. Compelling evidence against my translation of the phrase *ratione ipsius* is provided by a passage from his letter to Father Dinet in which Descartes characterizes what Regius had said as “those substances are called incomplete, in relation to the composite (*ratione compositi*) which arises from their union” (Haldane and Ross 1911, 2: 363; AT 7: 585–6.)

Second, I asserted that Rozemond is not justified in dismissing Descartes's remark in the letter to Father Dinet that things that are incomplete with respect to something else have a natural aptitude to be united. Here is the entire quotation:

therefore, they [the proponents of the thesis that the union of mind and body arises *per accidens*] denied neither the substantial union by which mind is conjoined to body nor the natural aptitude of each part to that union, as is clear from that fact that they added immediately afterwards: “those substances are called incomplete in relation to the composite which arises from their union.” (7:585)

What I would emphasize now about this passage is that Descartes is expressing the view that mind and body have a natural aptitude to be united, that is, it is natural for them to be united, even if it is not part of their essence to be united. Moreover, this follows from its being the case that mind and body are incomplete in relation to the composite human being, that is, something that is one *per se*. I think it is perfectly reasonable for Descartes to draw a distinction between what is essential to a thing and what is natural for that thing, and, in addition, I think that he can still claim to have a hylomorphic conception of a human being so long as he maintains that it is unnatural for its parts to be separated.

My conclusion is that Descartes does not in fact have other fundamental commitments that are incompatible with his expressed endorsement of hylomorphism. Therefore there are not good grounds for accusing him of disingenuousness, a charge whose seriousness I believe is underestimated by those making it. I would also conclude that Descartes's account of the unity of the composite human being is no worse than that of his Aristotelian predecessors with whom he is so often unfavorably compared.

The Interaction Between Mind and Body

The Aristotelian model of causation with which Descartes was familiar is far different from our post-Humean model of causation. After Hume, the paradigm example of causation is one billiard ball striking another and the second billiard ball rolling away. In such a case there are two events, where the prior event is the cause of the subsequent event. For the Aristotelians, a paradigm example of causation would be a person lifting a vase. The effect is the vase's being lifted and the cause could be viewed either as the person doing the lifting or the person's act of lifting. In such a case it would be wrong to say that the effect is an event or process subsequent to the cause. The vase's being lifted is not temporally subsequent to the person's act of lifting (nor would we say it is subsequent to the person). Indeed, the stronger claim can be made that in such a case there is really only one event or process. The person's lifting of the vase is not a different event or process from the vase's being lifted. This Aristotelian model of causation is characterized by the doctrine of the identity of action and passion: the agent's action is one and the same change as the passion undergone by the patient.

Until fairly recently, probably due to their failure to pay close attention to the *Passions of the Soul*, commentators have overlooked the fact that Descartes embraces the Aristotelian model of causation. But he does so in the first two articles of the *Passions of the Soul*.⁴ In the first article he states the doctrine of the identity of action and passion:

I note that whatever takes place or occurs is generally called by philosophers a passion with regard to the subject to which it happens and an action with regard to that which makes it happen. Thus, although the agent and the patient are often very different, the action and the passion are always one and the same thing, which has these two names, because of the two diverse subjects to which it may be referred. (1:328; AT 11:328)

Lest there be any doubt that Descartes is merely attributing the doctrine to others and not embracing it himself, he employs it in the second article:

Next, I note also that we do not notice that there is any subject which acts more immediately upon our soul than the body to which it is joined. We should consequently recognize that what is a passion in the soul is usually an action in the body. (1:328; AT 11:328)

Descartes reveals in this second article that he has modified the doctrine in a significant way. Whereas the Aristotelians had located the agent's action in the patient on the grounds that the change was located in the patient and not in the agent bringing about the change, Descartes locates the agent's action in the agent. Thus Descartes is committing himself to the view that when an agent acts on a patient, that event or process exists in both subjects simultaneously. Since events for Descartes (at least those in the created world) are all going to fall under his ontological category of modes, this has the implication that there are modes that belong to two subjects at once, or straddling modes. When the body acts on the mind, that straddling mode will be a motion insofar as it is an action existing in the brain (Descartes notoriously attributes the relevant brain motions to the pineal gland), and it will be a sensation or passion of the soul insofar as it is a passion existing in the mind. When the mind acts on the body, the straddling mode will be a volition insofar as it is an action in the mind, and it will be a motion (again of the pineal gland) insofar as it is a passion in the body.

How does a particular type of action come to be paired with a particular type of passion? That is, why is one kind of brain motion the same event as my sensation of red and another kind of brain motion the same event as my sensation of yellow? Why is one kind of volition the same event as a part of my brain moving in one way and another kind of volition the same event as a part of my brain moving in another way? Descartes's view is that originally these pairings are all natural, that is, they are forged by God's will. What has only recently begun to be discussed by commentators is that Descartes also thinks that we can alter at least some of these pairings by means of what he calls habituation (this view has been most fully developed by Shapiro 2003). He argues that by techniques we would classify under the heading of behavior modification, we can bring it about that a kind of brain motion that naturally causes a given passion such as fear or anger can be made to bring about some other passion. Indeed, this is the key to our freedom, or at least it is the key to freedom for those of us with weak souls. Descartes thinks that to be free we must be able to act in accordance with our firm and determinate judgments concerning good and evil. People differ in their strength of soul, and the firm and determinate judgments of people with weak souls are overpowered by their passions. But if we can control which passions we have by means of habituation, then we can prevent ourselves from being overpowered by undesirable passions.

What has been referred to as the downfall of Cartesian metaphysics is the history of objections to Descartes's account of mind-body causal interaction (Watson 1966). How could an immaterial substance produce changes in the body and how could the body produce changes in an immaterial mind? My view is that it is one of the deepest ironies in the history of philosophy that the problem of interaction has been so

influentially deployed in the attempt to make Descartes look worse than other philosophers.

Consider the philosophical landscape before Descartes. His Aristotelian predecessors drew a sharp distinction between self-movers and non-self-movers that coincided with the distinction between living things and non-living things. They argued that the principle of movement in a self-mover could not be a body, but had to be its form, that is, its soul. In the case of human beings, the soul was considered to be wholly immaterial. Descartes came along and made a radical claim. He asserted that there can be self-movers, most notably watches and animals, that lack souls. Their internal principle of movement is entirely corporeal. It is this radical view that one would have expected Descartes to be challenged on, but instead he was attacked precisely for what he retained of his predecessors' theory, namely, that an immaterial principle can be the source of self-movement.

Not only is Descartes's account of the explanation of our capacity for self-movement no worse than that of his predecessors, I would argue that we are deluding ourselves if we think we have made any significant progress since Descartes in providing a satisfactory account of agency. It is one of the most fundamental features of human existence that we can move parts of our body. We know that in order to do this we have to get parts of our brains to move. How do we get the right parts of our brains to move? Descartes's answer, again fundamentally the same as that of his predecessors, appeals to the notion of the will. His view is that we can form volitions to do things, and these volitions are acts of the mind that terminate in the body, that is, the passion with which they are paired is the appropriate brain motion. We might think of these volitions, for Descartes, as tryings. If I try to move my tongue in a certain way, that trying is paired with the appropriate pattern of neurons firing (according to the doctrine of the identity of action and passion, my trying to move my tongue in a certain way is the same event as those neurons firing). Again, on Descartes's view, habituation can lead to rewiring. Instead of being paired with trying to move my tongue in a certain way, that pattern of neurons firing could come to be paired with my trying to utter a particular word.

It seems to me that Descartes is probably correct that if we are to be considered the causes of our bodily motions, there must be something more basic that we can do – whether we describe this as willing to do something or trying to do something – by means of which we get our brains to move in the right way. I do not see any philosophically superior alternatives. For example, one might try to claim that the most basic thing we do is to move the relevant parts of the brain and we can dispense with the notion of willing or trying as a more basic action. But I don't see this as an improvement in terms of explanatory power, because the suggestion that the most basic thing we do is to move parts of the brain seems as least as mysterious as the suggestion that the most basic thing we do is to will to do things or to try to do things. Or, again, one might try to account for agency by giving up the notion of agent causation entirely, that is, by denying that at the most fundamental level of explanation I do things and instead adopting a Humean model according to which the self and its agency are analyzed in terms of sequences of events. This is the main path which analytic philosophy of mind seems to have taken, but I think that such attempts to provide reductive analyses of agency turn out to be eliminative accounts (that is, accounts according to which the thing being analyzed turns out not to exist).

Gilbert Ryle's objection that accounts of the mind's action on the body like Descartes's lead to an infinite regress is not convincing (Ryle 1949: 67). Just because Descartes would appeal to volitions or tryings as the most basic actions which bring about voluntary bodily motions does not imply that other volitions or tryings are required to bring about those volitions or tryings. But it is true that agency would in the end be something brute and unanalyzable – the very notion of a most basic action requires this. This is not to say that there can be no causal explanation of why we will or try to do something. Descartes is committed to the view that so long as we have a clear and distinct idea that some action is good, we will be compelled to will or to try to do that thing.⁵

In regard to his account of the body's action on the mind, Descartes deserves credit both for eliminating the Scholastics' sensible species (those sensible, immaterial forms that were thought to be emitted by the sensible object and received in the sense organs) and for recognizing that sensations and emotions have as their immediate cause motions in the brain. To keep things in perspective, it is important to bear in mind that several of Descartes's successors adopted radical and counterintuitive positions when it comes to the possibility of the body's action on the mind. Spinoza and Leibniz denied that bodies can be the causes of thoughts of any kind, including sensations. Berkeley and Reid argued that only beings with a will are capable of being causes. Malebranche argued that only God can be a cause.

To be sure, Descartes's account of why particular types of brain motions are paired with particular types of sensations or passions – that they were willed to be that way by God or hooked together by habituation – is not satisfactory. But many contemporary philosophers would acknowledge that we still do not have a better account and that the prospects for finding one are dim.

Let me conclude by noting an ironic misconception of Descartes in popular culture. By distinguishing mind from body, Descartes is commonly thought to have mistakenly led people to believe that our bodily health is independent of our state of mind. But in fact Descartes's view is that our bodily health depends not only on our passions but also on our beliefs. So he wrote to Princess Elizabeth that there is "no thought more proper for preserving health than a strong conviction and firm belief that the architecture of our bodies is so thoroughly sound that when we are well we cannot easily fall ill" (3:237; AT 5:65).

Notes

- 1 My view is that Descartes thinks his account of the relation between mind and body is necessary for an ontological explanation of the unity of the composite human being, but that it provides only a teleological explanation of the sensations we have and is not necessary to provide an ontological explanation of our capacity to have those sensations.
- 2 Existing whole in the whole and whole in the part is part and parcel of hylomorphism because it was considered to be a necessary condition for something to count as a substantial form. However, as Mark Kulstad has pointed out, it cannot by itself be a sufficient condition, otherwise, since God was thought to exist whole in the whole universe and whole in the part, the objectionable conclusion would follow that God is the soul of the world. Marleen Rozemond

(2003: 363) has stated that this language is “evocative of hylomorphism” and to this extent she agrees with me. However, she argues that it does not show that Descartes endorses “full-fledged hylomorphism.” As far as I can determine she offers two reasons for this: first, Descartes does not regard the soul as the source of life of each part of the body; and second, that his watch analogy in the *Passions* shows that he rejects hylomorphism (pp. 363–4). I discuss both of these objections below.

- 3 On this account, Spinoza’s God would not be a simple but rather a composite substance, because God’s attributes are conceptually independent.
- 4 He also endorses the doctrine of the identity of action and passion in an August, 1641 letter to an unknown correspondent (3:192–3; AT 3:428).
- 5 Alan Nelson (1997) reads Descartes as maintaining that it is in principle impossible for us to have clear and distinct ideas about practical matters because the complexity of external particulars renders our ideas of them confused to some degree.

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Chapter 24

Animals

GARY HATFIELD

Descartes notoriously proposed that (non-human) animals are mere machines, devoid of sensation or feeling. This proposal, which in itself seems ludicrous, becomes intelligible when seen within Descartes's larger philosophical scheme. In this scheme, sensation and feeling can arise only in a mind: an immaterial substance, distinct from matter. For various reasons, Descartes denied minds to animals, and, on that basis, he denied them feeling.

In the body of ancient, medieval, and Renaissance philosophy and theology that informed Descartes's philosophy, most thinkers considered the divide between non-human and human animals to be large and significant. Most philosophers held that only the human animal is rational, self-reflective, and free to deliberate and choose. They viewed non-human animals as possessing sentience and some simple cognitive abilities, but as unable to entertain universal notions (such as the concept of *animal*, which applies to all animals) or to represent cognitively anything except concrete, particular bodies. Theologically, most held that, while the human soul is immortal, other animals either lack a soul or have a soul that perishes with the body. Descartes reinforced the metaphysical divide between humans and other animals. He upheld the immortality of the human soul, and he argued that, if other animals had souls, they too would be immortal – a theologically heterodox consequence that he rejected, therefore denying souls to animals.

Nonetheless, animals are like human beings in that they are alive, they eat and drink to maintain their bodies, they have sense organs, and they move. Many earlier thinkers explained such commonalities by attributing a lower form of soul, an *animal soul*, to both human and non-human animals. Plato held that this common animal soul explains sentience in humans and animals alike, and that humans additionally have an intellectual soul. Aristotle and his medieval followers held that human and animal souls share the *vegetative* (or vital) powers of nutrition, growth, and reproduction and the *sensitive* powers of sensation and movement, but that only the human soul has the power of *reason* or *intellect*.

Given that Descartes denied any sort of soul to animals, his other philosophical commitments entailed that he must explain the vital and sensitive powers of non-human animals through purely material causes. Indeed, he welcomed this task, for he was engaged in the larger project of providing purely mechanistic explanations for all

natural phenomena of the material world. Animal bodies form functional unities that are adapted to environmental circumstances and that maintain themselves by eating and drinking when they need to. Earlier thinkers invoked animal souls to explain such functional unity and goal-seeking behavior. In his new physics, Descartes sought to discover or hypothesize material mechanisms that would explain the physiological and behavioral capacities of animals, including how they maintain themselves by seeking food and drink, reproduce themselves, and modify their behavior to fit current circumstances. Metaphysically, his new perspective raised the problem of accounting for the functional unity of the animal body considered as a purely material construction, devoid of an active, organizing power such as the sensitive soul.

Descartes's project becomes even more challenging if we ask whence come such mechanisms that are capable of performing the functions of living things. Officially, Descartes endorsed the accepted theological orthodoxy, that God designed and created the bodily mechanisms of humans and animals. However, in his natural philosophy he set himself the task of explaining the origin of animals as part of the natural development of the universe out of an original chaotic soup of material particles. Within this naturalistic perspective, he must explain how, through purely material processes, the functionally organized bodies of living things (plants and animals) could be produced from non-living matter. Without a designing creator, how do animal bodies arise that are capable of digesting food, growing, reproducing, and performing the behaviors needed to preserve life and health?

This chapter considers philosophical problems concerning non-human (and sometimes human) animals, including their metaphysical, physical, and moral status, their origin, what makes them alive, their functional organization, and the basis of their sensitive and cognitive capacities. I proceed by assuming what most of Descartes's followers and interpreters have held: that Descartes proposed that animals lack sentience, feeling, and genuinely cognitive representations of things. However, some scholars interpret Descartes differently, denying that he excluded sentience, feeling, and representation from animals, and I will consider the evidence for these interpretations as well. Finally, hereafter, when I use the word "animal" without further qualification, it means non-human animal.

Status of Animals

Among ancient Greek philosophers, Plato accorded a modicum of reason to animals, and Aristotle denied them reason. Thomas Aquinas, the single most important philosopher among medieval Christian theologians, codified this denial. He drew the implication – which Augustine of Hippo, the most important Christian theologian of late antiquity, had only suggested – that only the human animal has an immortal soul (Sorabji 1993). Aquinas thereby placed humankind on the frontier between worldly and divine. Human beings are linked to the animal world through their bodily capacities, but they are similar to angels and analogous to God through their immaterial, hence immortal, souls.

Aquinas's philosophical argument for the special status of humankind drew upon the Aristotelian account of the vital and cognitive faculties of plants, animals, and

human beings, which attributed differing kinds of souls to each: vegetative souls to plants; sensitive souls to animals; but rational souls to human beings alone. Just as the sensitive soul of animals also incorporates the vegetative powers (nutrition, growth, and reproduction), the human rational soul incorporates both these and the sensitive (sensory and motor) powers as well. The higher, rational, powers unique to humans include intellection and voluntary action, or free will (Thomas Aquinas 1964–81: I.76.4, 79.1). Following a hint in Aristotle, Aquinas argued that the vegetative and sensitive souls are intrinsically united to corporeal organs in their operation and that they therefore perish with the body of the plant or animal (Sorabji 1993: 201). By contrast, the rational power of the human soul operates independently of any bodily organ (even if, for the human soul to think during this life, it must use the faculty of imagination, which does require a corporeal organ, in the brain) (Hatfield 1998: 95–61). Accordingly, the rational soul is deemed to be immaterial and immortal. This generalized Aristotelian account of animal and human souls and their powers and status was widely held in Descartes's time (e.g., Dupleix 1990: 521–652; Eustachius a Sancto Paulo 1998: 83–92).

Augustine and Aquinas held a further thesis about the relation between humans and animals: that animals are created for the use of humankind, and so may be killed and eaten (Sorabji 1993: 198). The metaphysical divide between rational and non-rational, together with this view about God's providential aims, rendered animals as means toward human ends.

There were dissenters regarding the cognitive and moral divide between humans and animals. The ancient atomists, Epicurus and Lucretius, argued that all minds are purely material, formed from subtle matter, that is, from very fine material atoms in the bodies of human and non-human animals (Lucretius 1994: 71–2). These atoms possess only the qualities of shape, size, motion, and weight (pp. 45–6). Sensation arises when groups of atoms – shaped as images, in the case of vision – enter the sense organs and brain. Thought occurs when images interact with the subtle matter of the mind (pp. 113–16).

In the seventeenth century, Thomas Hobbes developed a similar position. He agreed that sensation involves nothing other than bare interactions between the matter inside and outside sentient bodies, and he also restricted the content of thought to images. Accordingly, he recognized no intrinsic, metaphysical distinction between human and animal cognition: human thought is a function of the faculty of imagination – a faculty that theorists generally, Aquinas included, agreed is common to humans and animals. Hobbes explained the human capacity for reasoning as arising through the acquisition of language. By providing a range of distinguishable symbols, language increases the power of the imagination for thinking (Hatfield 1998: 972–5).

In the century prior to Descartes and Hobbes, Michel de Montaigne (1965) argued that humans are not different in kind from animals, either morally or cognitively. His arguments drew upon a range of literature, with frequent reference to Lucretius. In effect, he denied any metaphysical distinction between humans and animals, whether founded on supposed differences in rationality or in moral standing.

Descartes widened and reconceived the gap between animals and human beings. He viewed Aristotle's and Aquinas's theories as accounting for human souls by adding a new power – that of reason – to the animal soul (3:62; AT 1:415). By contrast,

Descartes rejected the animal soul. Thus arose the task (which he coveted) of explaining the capacities of both human and animal bodies through configurations of deanimated matter: matter devoid of any properties except shape, size, position, and motion. He continued to place human beings on the border between the material world and the divine: they have bodies, but they also have immaterial minds. As he saw things, thought and feeling are functions of an unextended, immaterial, thinking substance. But, further, since he viewed feeling as a function of thought, if animals had souls that felt, they would exhibit signs of thought (1:140–1; AT 6:58–9; 3:374; AT 5:345).

In his *Discourse on the Method*, Descartes proposed two criteria to prove that animals show no signs of thought, and indeed “have no reason at all” (1:140; AT 6:58). He described animals as purely material bodies, which he labeled as “machines” due to their intricate organization. He then contended that, although such machines might exhibit all the behaviors characteristic of animals, two aspects of their behavior would reveal that they lack minds. First, “they could never use words, or put together other signs, as we do in order to declare our thoughts to others” (1:140; AT 6:56). Parrots and magpies can pronounce words that sound like human language, but they do not exhibit the behavior that indicates genuine speech: “they cannot show that they are thinking what they are saying” (1:140; AT 6:57). Second, although mindless machines might do some things better than can human beings (as bees do in building a honeycomb), they would fail at many other tasks. This shows that their skill derives from innate mechanisms rather than from reason, because “reason is a universal instrument which can be used in all kinds of situations” (1:140; AT 6:57). If animals possessed reason, they would show the same sort of general problem-solving abilities as do human beings.

Descartes claims that these arguments reveal the profound gap between animals and humans: “when we know how much the beasts differ from us, we understand much better the arguments which prove that our soul is of a nature entirely independent of the body, and consequently that it is not bound to die with it” (1:141; AT 6:59). As did Aquinas, he concluded that reason is an immaterial power, so that the possession of reason proves that the human soul is capable of surviving the body. Unlike Aquinas, Descartes refused to countenance a vegetative or sensory soul. In his *Treatise on Man*, which he composed in the early 1630s and described in the *Discourse* (of 1637), he asserts that his animal machines could perform vital and sensitive functions without “any vegetative or sensitive soul” (1:108; AT 11:202). This was, in effect, to deny that animals possess any sentience at all, on the assumption that matter by itself is incapable of feeling (3:98–100; AT 2:38–41).

A few years later, in a letter to his chief correspondent, Marin Mersenne, Descartes clarified the relation between sentience and the human (or “rational”) soul. He conceded that animals might exhibit the kind of behavior that we exhibit when we feel pain, but he contended that they do not actually feel pain, because they have no minds:

I do not explain the feeling of pain without reference to the soul. For in my view pain exists only in the understanding. What I do explain is all the external movements which accompany this feeling in us; in animals it is these movements alone which occur, and not pain in the strict sense. (June 11, 1640; 3:148; AT 3:85, 11)

Animals, we can infer, possess no faculty of “understanding” and so no soul or mind; hence, they feel no pain. (On Descartes’s equation of the immaterial soul with mind, see 2:114, 246; AT 7:161, 356.)

By making sentience depend on the understanding, Descartes deviates from the Aristotelian position and leaves no room for an animal soul that lacks reason and understanding but still possesses sentience. In the *Meditations*, Descartes elaborated his theory of mind in a way that illuminates this connection between sentience and understanding. Matter is a spatially extended and unthinking substance, and mind is an unextended and thinking substance (2:54; AT 7:78). They share no properties: matter can’t think, and thoughts (or the mind that thinks them) are not extended. Further, the one essential property of thinking substance is intellect or understanding. Sensory perception and consciousness depend on the intellectual attribute of thinking substance (2:54–5, 113, 382; AT 7:79, 160, 559). Thinking substance also has a faculty of volition, that is, of willing; willing is a sort of thought, or thought-activity (2:19; AT 7:28; 1:204; AT 8A:17).

Descartes’s theory therefore marks two further differences between human beings and animals, beyond language use and general reasoning: human beings have sentience and consciousness, animals do not; human beings exercise will, animals do not. The denial of will to animals was commonplace. Aquinas spoke of animal “appetite” rather than will (1964–81: I.81.3); for him, such appetite involved sentience and feeling.

Finally, Descartes did not endorse the usual notion that animals were created for human use. He did not deny it outright, but he contended that we could never know it, because we are unable to discern God’s ends. For the latter reason, he generally banished from natural philosophy the search for “final causes” (2:39; AT 7:55): “it would be the height of presumption if we were to imagine that all things were created by God for our benefit alone, or even to suppose that the power of our minds can grasp the ends which he set before himself in creating the universe” (1:248; AT 8A:81). He allowed that, ethically, it may be “an act of piety to assert that God made everything for our benefit”; but, to assume “in the study of physics” that “all things were in fact made for our benefit, in the sense that they have no other use,” would be “utterly ridiculous and inept,” since “many things exist, or once existed, though they are here no longer, which have never been seen or thought of by any man, and have never been of any use to anyone” (1:248–9; AT 8A:81).

Origins of Animals

Common medieval and early modern explanations of how living things (plants and animals) reproduce have them arising through the propagation of “seeds” or from the mixing of seminal fluids. In the Aristotelian scheme, male animals provide the “form” of the living thing (the animal soul), female animals the “matter.” According to Aquinas and his followers, God infuses the rational soul in human animals when the embryo has reached an appropriate stage of development (Roger 1997: 49, 72).

Such a process might explain the origin of individual animals, but how did the first male and female parents arise? Augustine, Aquinas, and other Christian theologians

believed that God designed and created original pairs of plants and animals, from which subsequent living things have descended through the usual processes of reproduction. However, special creation and sexual reproduction were not the only going accounts of the origins of (at least some) plants and animals. Many thinkers, including Christian thinkers, held that, after creation, some plants and even some animals, such as insects or worms, arise through spontaneous generation (Roger 1997: 61). When conditions are right in rotting meat, mud, or dead wood, flies or worms may come forth. Indeed, Lucretius held that spontaneous generation could even explain the origin of the first plants and animals: they were born of the Earth in an earlier age when its crust was hotter and wetter.

Lucretius envisioned an account of the formation of the heavens, earth, plants, and animals from the chance conglomeration of atoms in the void. The atoms, which naturally fall downward (recall that these atoms have weight, in addition to shape, size, and motion), are diverted from their uniform falling when some of them, on some occasions, inexplicably “swerve” (1994: 43). The resulting collisions among particles led to the formation of the heavens and Earth. Over time, the atoms variously combine; indeed, they “have come together in every possible way and tested everything that could be formed by their combination” (p. 139). Among these combinations were living things. Once the Earth had formed, it spontaneously produced plants (p. 148). Subsequently, it brought forth all the animals, including human beings, through a process that still sometimes occurs:

Even now multitudes of animals are formed out of the earth with the aid of showers and the sun’s genial warmth. So it would not have been surprising if more and bigger ones had taken shape and developed in those days, when earth and ether were young. (p. 149)

Processes similar to those that (ostensibly) now cause spontaneous generation brought forth all the animal kinds in an earlier age. Birds were formed first; then, as there was “a great superfluous of heat and moisture in the soil,” there formed “wombs, clinging to the earth by roots.” These wombs brought forth mammals who were suckled by Earthly extrusions of “a juice resembling milk.” Indeed, “here is further proof that the name of mother has rightly been bestowed on the earth, since it brought forth the human race and gave birth to every beast that runs wild among the high hills” (p. 149).

Descartes knew Lucretius’ work well enough to attempt to quote it from memory (3:63; AT 1:417). In his post-student days in Holland (1618–19), he studied atomism (and mathematics) with Isaac Beeckman (AT 10:67–8). In 1619–20, he started a notebook entry named “Democritica,” after the ancient atomist Democritus (AT 10:8). In this early period, he was enthralled by the atomist picture, and may, in atomist fashion, have considered the soul as subtle matter, like wind or fire (1:5; AT 10:218; 2:17; AT 7:26). He later rejected atomism in favor of corpuscularism (the view that matter is infinitely divisible, where atoms are indivisible), and he adopted a view that the soul or mind is immaterial. Nonetheless, for the material world he reinterpreted and developed the atomist cosmogony in corpuscular terms.

Descartes described the formation of the solar system and Earth in two major works, the *Principles of Philosophy* and the earlier *World, or Treatise on Light*. In both works, he nominally endorsed the “doctrine of Christian faith,” that the Earth and its plants and

animals were created by God just as they are now (1:256; AT 8A:99–100; also 1:90, 99; AT 11:32, 120). Nonetheless, within natural philosophy he considered it more useful to develop (“hypothetically,” he said) an account in which God’s role is limited to creating the material soup of moving particles from which a world like ours arises. He wrote in the *Principles*:

if we want to understand the nature of plants or of men, it is much better to consider how they can gradually grow from seeds than to consider how they were created by God at the very beginning of the world. Thus we may be able to think up certain very simple and easily known principles which can serve, as it were, as the seeds from which we can demonstrate that the stars, earth and indeed everything we observe in this visible world could have sprung. (1:256; AT 8A:100)

He begins with the hypothesis that God has created bare, extended matter that forms a plenum of particles of various sizes; he imparts to these particles a certain quantity of motion that he keeps constant as it is transferred among the particles in accordance with his three laws of motion (1:240–3; AT 8A:61–6). Descartes describes how, out of this soup, suns and planetary systems form, how continents and mountains form on the Earth, and how minerals form.

How plants and animals form should come next, yet Descartes does not cover this topic in either the *Principles* or the *World*. But he was working on it. In the *Discourse*, describing the as yet unpublished *World*, he encourages us to believe that, from matter in motion, “all purely material things could in the course of time have come to be just as we now see them” (1:133–4; AT 6:45). He then implies that he had already provided an account of the formation of plants in the *World*, but that animals and human beings had stymied him:

From the description of inanimate bodies and plants I went on to describe animals, and in particular men. But I did not yet have sufficient knowledge to speak of them in the same manner as I did of the other things – that is, by demonstrating effects from causes and showing from what seeds and in what manner nature must produce them. (1:134; AT 6:45)

The part of the work in which he described the formation of plants has not survived (assuming he actually wrote it); he continued to develop, but never published, his account of the generation of animals.

In 1639, Descartes wrote to Mersenne that “the number and the orderly arrangement of the nerves, veins, bones and other parts of an animal do not show that nature is insufficient to form them, provided you suppose that in everything nature acts exactly in accordance with the laws of mechanics” (3:134; AT 2:525). Having previously excluded the generation of animals from his *World* because it would “take me too long” to explain (3:39; AT 1:254), he now boasts that he “can explain it all in detail, just as in my *Meteorology* I explained the origin of a grain of salt or a crystal of snow,” saying that if he were starting his *World* over, he would include this explanation (3:134–5; AT 2:525). Ten years later, he expressed dissatisfaction with his explanation of the “formation” of animals, but, although discouraged, he believed that he could finish it and his entire physics, given the needed time and experiments (AT 5:261).

If Descartes did not achieve a satisfactory account of how animals might arise naturally out of the chaos, it was not for want of trying. In some of his early recorded thoughts on generation (both spontaneous and through mating), he sketched the basic process as starting from the circular flowing of subtle matter (spirits and blood) that heat has enlivened; this flowing matter presses particles together to form tubular structures and closed sacs, eventually accruing an entire body (AT 11:505–6). The same process might form animals spontaneously in nature: “so little is required to make an animal, it is really not surprising that we see so many animals, so many worms, so many insects spontaneously forming in all putrefied matter” (AT 11:506). In January 1648, as he composed the portion of his *Description of the Human Body* on generation, he retained the basic conception: procreative generation results when the seminal fluids from male and female form a kind of intrauterine vortex, through which various organs and limbs are produced (1:321–4; AT 11:252–7). In his conversation with Burman at this time (3:349; AT 5:168–9), he also made clear that he considered the account of creation in Genesis to be metaphorical. We may therefore take Descartes to have believed that plants, animals, and human bodies really were formed naturally as the cosmos developed, just as animal bodies are now formed naturally through material interactions in procreation.

Life, Health, and Function

Plants, animals, and human beings exhibit the traditional marks of life: nutrition, growth, and reproduction. Further, animals have sense organs and motor apparatus that allow them to seek nutrients, avoid harms, and locate benefits. Descartes acknowledged that these phenomena are displayed by living things. He contended that all these phenomena could be explained mechanistically, by the “disposition” or “arrangement” of plant or animal organs, just as the behavior of a clock is explained by its “counterweights and wheels” or its “wheels and springs” (1:108; AT 11:202; 1:139–41; AT 6:55–9). Further, he held that the same mechanisms can explain how animals behave so as to approach what is beneficial and avoid what is harmful to their bodies (Descartes 1998: 163; AT 11:193, 519).

The dominant explanation of these phenomena in Descartes’s time invoked Aristotelian teleology. A teleological explanation appeals to aims or ends or outcomes in explaining a process. Plants and animals incorporate nutrients *so that* their bodies will grow and sustain themselves, they mate *in order to* reproduce, they avoid harm and seek benefit *in order to* preserve their bodies. In Aristotelian terms, the development, maintenance, and reproduction of the plant or animal is the end or “final cause” of the plant’s or animal’s vegetative soul or power; and the preservation and reproduction of the animal is the final cause of the animal’s sensitive soul (Aristotle 1984: 661). Christian theologians such as Aquinas adapted the notion that lower souls pursue ends or final causes to their conception of the world as created. Thus, on their view plants and animals seek to live and reproduce because God found it good to make things that have those ends (Thomas Aquinas 1964–81: I.44.4, 47.1, 77.3). Here, the notion of an end or final cause has both an external aspect (God as creator, who orders things

according to his goodness) and an internal aspect (God creates things which themselves have Aristotelian internal ends).

As noted above, Descartes sought to banish from natural philosophy any appeal to God's ends. He also banished vegetative and sensitive souls, and hence he precluded explaining the self-preserving behavior of plants and animals in terms of final causes that are embedded in such souls. In the material world, he permitted causation only through the impact of bodies (large or small) on other bodies. Unlike Aristotelian physics, there are no "forms" embodying final causes through which they order and direct the motions of even inanimate things.

Did Descartes, then, remove all final causes from the world? In fact, no. As many scholars have observed (e.g., Laporte 1928; Simmons 2001), Descartes himself appealed to teleology and final causes in the *Meditations*. He describes God's ends in setting up the mind-brain relation: God sought to align sensations with brain states so that the sensations would best contribute to "the preservation of the healthy man" (2:60; AT 7:87). God made the mental feeling of thirst a generally reliable indicator that we should drink, and he arranged that the sensations of the external senses generally lead us toward what is beneficial and away from what is harmful to the body (2:56; AT 7:81).

So far, Descartes has invoked teleology only in God's ends regarding the mind-brain relation. Descartes also used teleological talk in describing the parts of the body (Hatfield 1992: 361), when he spoke of the "functions" or "uses" of those parts. These include the generic functions usually associated with the vegetative soul (nutrition, growth, and reproduction), as well as more specific functions, such as alterations in the blood to make it suitable for nourishing the body or for producing the spirits in the brain (1:108; AT 11:202; 1:318; AT 11:244, trans. alt.). Are these functions a product of God's designing intentions and creative acts? Descartes affirms so in passages already cited. Some scholars (e.g., Garrett 1999) have therefore urged that he allowed final causes and teleology only in God's creative acts (as well as in the purposes of human agents). And yet Descartes also offers a cosmogony in which plants and animals arise out of the chaos, without special creation. In that case, what becomes of his talk of functions? Can the notion that an animal's parts cooperate to preserve the animal's health be explained in a natural cosmogony?

To answer these questions, we need to disentangle various notions of teleology, to see which Descartes did or could endorse. In doing so, we should keep in mind why Descartes would want to avoid final causes in nature. Apart from acknowledging that minds act for purposes, Descartes would find unintelligible any case in which something that hasn't happened yet (a future "end state"), or in which something that is not in contact with a body (a distant "end state"), is able to influence the motion of a body.

First, we should distinguish *external* from *internal* final causes. An external final cause would come from a designer or creator; it exhibits external teleology because the ends are fixed externally. If I build a mousetrap, I design it with a structure that will achieve a desired outcome. My desire to catch mice fixes the end and so determines the function of the trap. Similarly, if God thinks it good to adjust our sensations to our nervous systems, then his external intention fixes the function of those sensations (to preserve the body). In the traditional picture, according to which God designs animal

bodies, the functions of their parts would be fixed externally. Descartes offers a different picture, in which a world like ours arises without God directly fashioning its parts. In Descartes's naturalistic cosmogony, God institutes laws of motion that produce a "quite perfect world" (1:91; AT 11:35); these laws depend on God's will (1:92; AT 11:36; 2:294; AT 7:435–6), and in choosing the laws, God would also choose the type of world they would produce. However, that world and the things in it arise out of an initial soup of particles, which might have been totally chaotic (a random ordering: 1:257; AT 8A:101–3). Hence, God does not initially arrange the particles so that, through Laplacean determinism, they unfold in a fixed causal sequence that leads to our world. Rather, our world emerges through natural processes. This suggests that, even if God foresees the outcome, natural processes must create the organized entities in the world, from solar systems and mountains to plant and animal bodies. Let us see if these processes sustain a notion of internal final cause, or immanent teleology.

Internal final causes are immanent to the thing that acts. We can distinguish two sorts of immanent teleology: those in which the end-state directly causes the behavior ("end-state caused"), and those in which a previous tendency to produce a certain end-state causes a type of thing or a type of mechanism to exist now ("end-state selected"). In the end-state caused case, the end or goal causally influences the body. This sort of final causation is possible for minded beings: the end state of crossing the street, as represented in my mind, causes me to direct my legs in a certain manner. Aristotelians posited this type of causality even in unthinking matter, for they held that the motion of the element "earth" is directed toward the center of the universe. The element moves toward the center by its own power, without any intermediary such as a force of attraction – and in this way the round globe of Earth is formed. Descartes restricts this type of end-state caused finality to thinking beings, rejecting the Aristotelian version in unthinking matter (or incorrectly accusing the Aristotelians of positing little souls in matter that know where to go: 2:298; AT 7:442; 3:216; AT 3:648).

In the case of end-state selected finality, a type of thing or mechanism exists (or continues to exist) because it regularly achieves a certain outcome (Wright 1973). Cases of end-state selection can be divided into two classes. In the first class, a thing exists because its designer or creator foresaw (or perhaps merely believed) that it would achieve a certain effect. Here, we have both external and internal finality. The designer chooses the effect, but the thing has the function of bringing it about. I make the mousetrap, but it exists because of what it can do (or what I think it can do). Therefore, the mousetrap itself has the function (immanent end) of catching mice. In the second class, natural processes "select" a thing because of what it can do. Through the random operation of natural causes, a thing or mechanism arises that has a certain effect: for example, an animal that can run faster in avoiding predators than do others of its type. The faster animal continues in existence (reproduces itself), whereas the slower ones get caught and so don't reproduce. There is no external teleology, since the selection process occurs blindly, with no end; and yet this process produces things that serve an end. This sort of end-state selection occurs in Darwinian natural selection, according to which variants of a biological trait are selected because they contribute to the survival of a given type of animal. Hearts exist because they pump blood. Their immanent end is pumping, because they have been blindly selected for doing that.

The internal teleology of the functional operations of animals, including growth, reproduction, pursuit of benefits, and avoidance of harms, might be explained if Descartes held that God designed the mechanisms that promote these life-functions; here, external teleology would fix internal teleology. However, since Descartes wanted to formulate a cosmogony in which plants and animals arise naturally from the chaos, he needs a mechanism for ends-selection that can sustain his talk about function.

Although he did not describe such a mechanism, a description was available to him. Lucretius not only posited that the various species originally arose through spontaneous generation, but also speculated that many more types of animal were produced than exist today. Among the products of spontaneous generation would be “monstrous and misshapen births,” such as “mouthless brutes,” or animals “disabled by the adhesion of their limbs to the body, so that they could neither do anything nor go anywhere nor keep out of harm’s way nor take what they needed.” Nature “debarred” them from increase because they couldn’t feed and perhaps couldn’t couple in procreation (1994: 150). Other erstwhile species, although capable of feeding and procreation, would die out through competition:

Every species that you now see drawing the breath of life has been protected and preserved from the beginning of the world either by cunning or by courage or by speed. In addition, there are many that survive under human protection because their usefulness has commended them to our care. (*Ibid.*)

The lion lives by courage, the fox by cunning, the stag by flight, the dog through human care. By contrast, other species have faced extinction:

Those that were gifted with none of these natural assets, unable either to live on their own resources or to make any contribution to human welfare, in return for which we might let their race feed in safety under our guardianship – all these, trapped in the toils of their own destiny, were fair game and easy prey for others, till nature brought their race to extinction. (p. 151)

Here, then, is a mechanism of end-state selection that might explain the occurrence of organisms that exhibit immanent teleology. Lucretius, who rejected teleology of the sort I have called “external” (pp. 116–17), provided a mechanism by which types of organisms are selected, and their descendants exist, because of the functioning of their parts. Although he did not overtly describe the organs of the surviving species as possessing immanent teleology, he spoke (p. 116) of their “use” (a term connoting function), and he described a mechanism of selection that would support ascriptions of immanent teleology. (Although Lucretius’ position is generically similar to Darwinian natural selection, he did not envision that later species evolve from earlier ones by selection on heritable variations; he has all species arise at once, with differences among them existing already, and some then die out through selection processes.)

Descartes’s extant writings include passages that describe the formation of the solar system and Earth and also the spontaneous generation of animals. He promises, but does not deliver, an account of the original formation of plants and animals. Descartes

repeats the Lucretian notion that over time the matter of the universe will combine “in every possible way” (Lucretius 1994: 133, 139), subject to his own laws of nature: “by the operation of these laws matter must successively assume all the forms of which it is capable; and, if we consider these forms in order, we will eventually be able to arrive at the form which characterizes the universe in its present state” (1:258; AT 8A:103). Thus, although there is no direct evidence that Descartes posited ends-selection, the mechanism fits his naturalistic cosmogony, as the above excerpts from Lucretius give witness. (Descartes also supposed that solar systems arise naturally, but he did not apply functional terminology to such systems – presumably because he accepted the traditional view that the parts of living things show a special unity and integrity of function, such that notions like health and disease apply to them, but not to solar systems.)

Let us grant that ends-selection could account for immanent teleology within Descartes’s chaotic cosmogony, and let us assume that Descartes would want to treat his function statements as instances of immanent teleology. That would provide him with a basis for ascribing functions to plant and animal organs that have wholly natural origins. We must still face a further metaphysical challenge, which questions whether Descartes can accommodate the functional unity of the animal machine within his metaphysics. The idea of ends-selection tacitly assumes that types of organisms, with heritable structures, form recognizable natural kinds that possess organic integrity. Two considerations militate against this assumption in Descartes’s natural philosophy.

First, as several scholars have noted (Laporte 1928: 389; Des Chene 2001: 135), in the *Meditations* Descartes appears to deny the reality of the notion of bodily well functioning as applied to the human body considered as a natural thing. Focusing on the bodily machine itself (apart from its relation to mind), he observes that a description of it as working improperly (when it is ill) is a mere “extraneous label” (2:59; AT 7:85). He compares this description to that of a broken clock, implying that the property of the clock’s being broken is not metaphysically real, because the alleged defect obtains only in relation to the time-keeping purposes of makers and users of clocks (external teleology).

This first problem, that animal bodies should not be assigned functional integrity apart from external purposes, lacks a certain plausibility. On the assumption that God is the designer of the human body (which Descartes publicly affirmed), the notion that being ill and deviating from his intended design is “merely” extraneous seems odd: surely God’s design could fix the internal ends of bodily mechanisms. But perhaps Descartes did not wish to put great weight on the design hypothesis (Descartes 2000: 65; AT 11:524). There is still a reason to doubt the cogency of his classifying a description of the body’s *proper* functioning as a merely extraneous label, for he held that death is constituted by the fact that the body becomes disordered or broken (1:314–15, 329–30; AT 11:225, 330–1). To say that being broken has no genuine reality in this case would be to assign a tenuous status to death itself, even though, for Descartes, death has the metaphysical consequence that the mind quits the body. Presumably, the mind quits the body because it detects the fact that the body is broken. Since the mind does not itself direct (or even understand) the body’s

functioning, there should be a brute natural fact of brokenness to which the mind responds at death. (A second response would treat well functioning as a physical, rather than metaphysical fact, per my discussion of the second problem.)

Second, scholars have objected that Descartes could not have a notion of immanent teleology because in his system animal bodies are not proper substances (Laporte 1928: 391–4) and do not form natural kinds (Des Chene 2001: 116). Apart from God, there are only two sorts of substance for Descartes: minds and body. Minds exist as separate individuals. The objection proceeds by supposing that Descartes held, or should have held (Grene 1985: 100–1), that all matter everywhere constitutes a single substance; what we call individual bodies are merely provisional collections of particles within the one material substance. If that is so, only substances have genuine metaphysical standing. Then animal bodies, like all individual bodies, are merely notional entities – that is, a mere product of the ways that humans divide up and classify the world for their own practical purposes.

For some *metaphysical* purposes, the functional organization of a body and its existence as an entity may be merely “extraneous” and notional. However, that need not prevent our construing animal bodies as properly unified entities for the purposes of Descartes’s *physics* or *natural philosophy*. The objection that individual bodies and types of body have a tenuous metaphysical status would also apply to various kinds of things that Descartes places at the center of his natural philosophy, including his notion of a “particle” (a piece of the one material substance) and the three kinds of matter he describes in the *Principles* (defined by the size and shape of particles). It would also apply to the various kinds of material things he examines in his natural philosophy: vortexes, suns, planets, magnets, minerals, metals, and so on. Perhaps, strictly speaking, vortexes, magnets, and salt are not metaphysically real kinds in Descartes’s metaphysics. But Descartes found that in natural philosophy, the properties of salt can be studied, outlined, and discussed, even if salt is a relatively late product of the processes through which the crust of the Earth and the oceans are formed (AT 8A:220–32).

Within his natural philosophy, Descartes believed that from his first principles – particles moving according to the laws of motion – he could deduce *a priori* (that is, from their causes) the basic constituents of the world: the basic kinds of particles, the formation of vortexes, stars, light, and planets; and even, in his ambitious moments, the formation of water, air, fire, and minerals (1:144; AT 6:64). Other, more particular things, including perhaps steel and magnets (AT 8A:281–7), cannot be derived *a priori*: we must collect their properties from natural history (through observation). Plants and animal bodies surely belong in this latter class. But that needn’t diminish their claims to physical kindhood. For, if only matter itself has a substantial essence or nature, then no physical kinds, whether derivable *a priori* or not, are metaphysical kinds.

When Descartes assigned a single essence – extension – to the entire material world, he made a revolutionary departure from Aristotelian natural philosophy. Consequently, he needed to retheorize the notion of a natural kind within his own natural philosophy. Metaphysically, he described extension as the “nature and essence” of material substance (1:210; AT 8A:25), which is consistent with there being only one substantial natural kind in the material world (extended matter). But he also speaks of the “natures” of various kinds of bodies: air, water, the Earth’s interior, quicksilver, magnets (1:271–6; AT 8A:231–79), plants, animals, and man (1:186; AT 9B:14). He thus employed a

double usage of the term “nature.” The second usage suggests that, in his physical scheme, magnets, plants, and animals are real *physical* kinds.

Metaphysically, these kinds lack a substantial nature that would be peculiar to each of them. They certainly do not have Aristotelian natures: substantial forms that govern their activity and that individuate them as kinds in Aristotle’s physics. Descartes, however, proposes a counterpart to Aristotelian natures. Having observed that changes in the one extended matter arise only through motion, he updates the notion of a corporeal nature:

any variation in matter or diversity in its many forms depends on motion. This seems to have been widely recognized by philosophers, since they have stated that nature is the principle of motion and rest. And what they meant by “nature” in this context is what causes all corporeal things to take on the characteristics of which we are aware in experience. (1:232–3; AT 8A:53)

Descartes suggests that a nature is a configuration of matter in motion that produces a standard set of effects, including the variety of corporeal things and their characteristics. A natural kind would then be such a configuration that exists in many instances. In Descartes’s world, this means that a natural kind arises through regular processes out of the chaos or from the subsequent stable patterns that develop. Perhaps that is reality enough for physical kinds and for functionally organized bodies in Descartes’s system.

Sense and Cognition

Animals engage in behaviors that are similar to those that humans engage in when we have sensory experience (3:99, 303, 365; AT 2:39, 4:574, 5:276). They respond differentially to light, sound, and other sensory stimulation: a dog may cry when struck or cringe at a loud noise. Animals can be trained to act differently than usual: to cringe at the sound of a violin (3:20; AT 1:134), or to remain still when partridges fly and not to flee at a gunshot, but instead to retrieve a dead partridge on command (1:348; AT 11:370). More generally, animals seek what is beneficial and avoid what is harmful (AT 11:519).

These animal abilities were granted by all, including Descartes. During the seventeenth century, there was an ongoing debate about how to explain them.

Prior to Descartes, philosophers who denied reason to animals usually did not deny them sentience and cognition, or (sometimes) knowledge. Although Aristotle had restricted animal cognition to sense perception, the Arabic commentator Ibn-Sina proposed that animals should be granted a special cognitive power, the “estimative faculty,” to explain how animals grasp properties that are not proper to any one sense: as when the sheep perceives that the wolf is an enemy, even though being an enemy is not a specifically visual property. Aquinas accepted the estimative faculty, and it became common doctrine concerning the sensitive soul (Sorabji 1993: 64). Before Descartes’s animal-machine hypothesis became known, seventeenth-century authors were agreed that animals possess cognitive powers. They debated whether to call these powers

“knowledge,” and whether these powers constitute a limited form of rationality that did not require immateriality and so did not portend immortality (e.g., La Chambre 1989).

Descartes altered all such debates by applying his animal-machine hypothesis to the control and direction of behavior. He argued, on both metaphysical and scientific grounds, that although animals exhibit complex behaviors, they are unfeeling machines.

Metaphysically, his new system led him to regard sensation as intrinsically intellectual. The mind’s properties all derive from the two chief forms of thought, intellection and will (1:204; AT 8A:17). Intellection includes sensation, imagination, and pure intellect (the ability to understand without contemplating images). The will includes desire, doubt, and affirming or denying. Sensation and memory, as well as earthly passions and desires, depend on the union and interaction of mind and body, but the mental effect in these sensations or emotions is a mode of intellection. Hence, if animals are denied intellect, they are denied sensation.

Descartes’s new conception of matter as possessing only the geometrically describable properties of shape, size, position, and motion was even more radical in the seventeenth century than his new conception of mind, for it deanimated matter, debarring active principles, Aristotelian substantial forms, and Aristotelian real qualities from it (Henry 1997: 59–70). Aristotelians considered the souls of beasts to be substantial forms. If Descartes could find a reason to reject such forms, he would have an argument for denying Aristotelian sensitive souls to animals.

Descartes offered both metaphysical and natural philosophical arguments to support his denial of substantial forms (and animal souls). The metaphysical arguments purporting to establish that extension is the essence of matter are well known. He also offered natural philosophical (or physical) arguments for corpuscularism, based upon its intelligibility and parsimony (Hatfield 1985: 151–6). The arguments from intelligibility are found in the *World* (1:90–1; AT 11:33) and the *Discourse* (1:132; AT 6:42–3); those from parsimony, in the *Meteorology* (Descartes 1965: 268; AT 6:239) and letter to Morin (3:107; AT 2:200). Descartes did not claim that these arguments *refute* the doctrine of substantial forms; rather, they show that he can explain all natural phenomena *without appealing* to such notions.

That is just what Descartes claims to do in the *Treatise*: to explain all the functions of animals – including sense-guided behavior and the pursuit of beneficial and the avoidance of harmful objects – through mechanical causes alone. He would not require “any vegetative or sensitive soul or other principle of movement and life, apart from its blood and its spirits, which are agitated by the heat of a fire burning continuously in its heart – a fire which has the same nature as all the fires that occur in inanimate bodies” (1:108; AT 11:202). In effect, Descartes imagines a hydraulic machine in which innate structures (“instincts”: Descartes 1998: 163; AT 11:192), sensory stimulation, and internal states of the organism (such as lack of food: Descartes 1998: 164; AT 11:194–5) direct the flow of animal spirits to the muscles so as to produce appropriate behavior.

Descartes here claims to be able to explain mechanistically the offices of the sensitive soul, including those that Aristotelians explained by invoking cognitive powers. He uses a combination of instinct and associative memory to account for the chief

psychological capacities in animals: sensory and motor response, associative learning (which might explain training), and situationally appropriate behavior. If his explanations test out, he could then press the comparative intelligibility of his basic principles (arrangements and motions of particles possessing only shape and size) and the parsimony of his explanations (material corpuscles alone, as opposed to myriad substantial forms, one for each type of plant and animal).

He has admitted that his natural philosophical arguments do not *prove* that substantial forms are not real, and hence that animals lack sensitive souls. He merely claims to provide simpler and more intelligible explanations than those which invoke such entities. His metaphysical arguments were supposed to take up the slack. In the *Meditations* (2:44, 54; AT 7:63, 78) and *Principles* (1:210; AT 8A:25), he claimed to establish that matter has *only* the properties of shape, size, position, and motion. This finding was meant to exclude from purely material things all substantial forms (which are active principles), real qualities (including the Aristotelian primary qualities of hot, cold, wet, and dry, which Descartes must now explain solely through extended matter in motion), and thought, including sensation.

Descartes's metaphysical argument for excluding animal souls invokes these premises: if animals have sentience, they must have minds; hence, they must exhibit intellect and reason, but they don't. His argument is, of course, subject to challenge. First, one might ask why animals should be denied reason. I examined Descartes's arguments for this conclusion in an earlier section.

Second, one might ask why there couldn't be minds that are merely sentient. This challenge suggests that animals might be assigned a lesser form of soul or mind, capable of sentience and limited cognition but lacking the resources for language use and general intelligence. Metaphysically, Descartes's reason for excluding this as a possibility stems from his purported direct insight that intellection is the one essential property of mind, which means that all minds must always have it. He further claimed that, if animals were given diminished minds, these would still have to be immaterial and hence immortal, an outcome he rejected on metaphysical and theological grounds (2:287; AT 7:426; 3:304; AT 4:576; 3:366; AT 5:277). He also held that the faculty of will is essentially infinite (2:40; AT 7:58), which entails that, if animal minds had wills, those wills would of necessity be as free as the human will, which he and his audience would have found implausible.

The third challenge asks why matter can't produce sentience, or even thought. Descartes might respond by denying that matter, or material states, are capable of representation, an essential ingredient (he might plausibly claim) in sensory perception and thought. This response could also provide a deeper reason for his position on the second challenge.

In the Aristotelian psychology, the sensitive soul receives representations of things via "sensible species" that are transmitted through a medium. In vision, the quality of color (a "real quality") is transmitted to the eye as a sensible species. Scholastic Aristotelians described sensible species as "intentional," which meant, first, that they have *diminished being* (an explication of Aristotle's "forms without matter": 1984: 674), and, second, that they *represent* the quality in the object.

Descartes assigned the ability to represent to mind, not to matter. Indeed, on one interpretation of his philosophy, representing is the very essence of mind (Hatfield

2003a: 259). If he indeed equated intellection with representing, then in saying that intellection is the essence of mind, he would also be saying that representation is its essence. This view accounts for consciousness by suggesting that, as representing powers, minds essentially represent (and so are conscious of) their own states (2:382; AT 7:559). If we further assume that the power to represent is essentially general – so that any being that can represent would be endowed not only with sensory representation but also with the ability to form general concepts – then we have an argument for Descartes’s much used premise that, if animals had souls, they would have reason or intellect.

This last assumption, concerning the generality of any representing power, may be too much to ask. One might well wonder why God couldn’t create lesser minds (3:304; AT 4:576), possessing only restricted powers of representation, lacking pure intellection and will, and having only sentience and sensory appetite (Pardies 1972). Or perhaps he could create animals that reason about particulars, but lack general concepts and the ability to reflect (La Chambre 1989), and so do not exhibit the general problem-solving ability that Descartes set as a criterion of mindedness. Indeed, Descartes himself allowed that faculties of intellect admit of differing degrees of perfection (2:40; AT 7:57). If forced to concede the metaphysical possibility of lesser animal minds, Descartes would have to fall back on his natural philosophical argument, that his soulless account of animal behavior is preferable for its parsimony (Newman 2001) and intelligibility. The question of animal sentience would then become a natural philosophical problem, concerning whether Descartes’s purely mechanistic explanations of animal behavior are adequate, or whether notions such as representation and feeling are in fact required in any plausible account of animal behavior.

Are Descartes’s Animals Unfeeling Machines?

Although most of Descartes’s followers (Rosenfield 1968: Appendix, B–D) and most scholars read Descartes as denying sentience to animals, a minority argues that he ascribes limited mental properties to them (Vartanian 1953: 210–12), making them sentient but not (reflectively) conscious (Cottingham 1998). These scholars appeal to textual evidence, and some additionally argue that Descartes needs to invoke intentionality in order to successfully explain the behavioral capacities of animals (Gaukroger 2002: 201, 203).

In a letter of 1649 to the English philosopher Henry More, Descartes refines his earlier, unequivocal stance (3:148; AT 3:85) that animals have no feeling. He now indicates that it is impossible to *prove* that animals either do or do not have feelings, “since the human mind does not reach into their hearts” (3:365; AT 5:277). Forgoing certainty, he regards the denial of sentience as the “most probable” conclusion, a position that is consistent with a retreat to natural philosophical (as opposed to metaphysical) arguments.

Scholars who say that Descartes actually granted feeling to animals point especially to two passages. The first is his letter of 1646 to the Marquess of Newcastle, in which he speaks of animals expressing “the hope of eating” and “their fear, their hope, or their joy” (3:303; AT 4:574). Here, Descartes has animals “expressing” their emotions or

passions. This way of speaking is also found in the *Treatise*, in which Descartes mentions the “passions” of the animal body in the absence of mind. (In the *Treatise*, Descartes’s descriptions apply to animal behavior as well as to human behavior that occurs without thought: 2:161, AT 7:229–30; 3:149; AT 3:122.) Indeed, in a letter from 1638, he had warned that people mistakenly infer that animals have “feelings and passions like ours” because animals behave similarly to how we behave when we have feelings. In his view, the correct view is that animals still are “automatons” without “any real feeling or emotion in them,” but that their outward behavior nonetheless resembles ours (3:99–100; AT 2:39–41). This position lets us easily interpret the letter to the Marquess as attributing to animals only *corporeal counterparts* to the passions: internal states that explain animal behavior but that do not involve genuine feeling.

The second passage occurs in the letter to More, in which Descartes denies that animals have sensation and thought “like us” (3:365–6; AT 5:277). After giving various arguments to show that this conclusion is the most plausible on the evidence, Descartes continues:

Please note that I am speaking of thought, and not of life or sensation. I do not deny life to animals, since I regard it as consisting simply in the heat of the heart; and I do not even deny sensation, insofar as it depends on a bodily organ. Thus my opinion is not so much cruel to animals as indulgent to human beings – at least to those who are not given to the superstitions of Pythagoras – since it absolves them from the suspicion of crime when they kill or eat animals. (3:366; AT 5:278–9)

Several points deserve attention. First, the Latin term here translated as “sensation” is *sensus*, which may mean simply the faculty of sense. Accordingly, the term need imply only that animals have sense organs that guide them when stimulated, leaving open how that function is carried out, whether by sentience or by unfeeling mechanisms. Second, the qualification “insofar as it depends on a bodily organ” suggests that Descartes here allows animals a faculty of sense in just this mechanistic manner. Third, it is difficult to understand Descartes’s final sentence about killing and eating animals if we suppose that he allows them genuine sentience. It seems plausible that Descartes means to alleviate human concerns about killing and eating sentient beings by indicating that animals aren’t really sentient after all. On the alternative reading, he would be saying that animals are sentient but not reflective, which doesn’t provide much comfort to those concerned with animal pain. In the end, the passage can easily be assimilated to the other places in which Descartes describes purely material, unfeeling sensory processes in animal bodies as performing many of the guidance functions that conscious sensation performs in human beings (e.g., 2:161–2; AT 7:229–31; 3:148; AT 3:85).

The other strategy for arguing that Descartes assigned sentience to animals appeals to the explanatory resources that he may seem to need (according to present-day lights, at least) in order to explain the behavioral capacities of animals. Gaukroger contends that, since Descartes assigns discriminative sensory responses to animals (they respond appropriately to differing environmental stimuli), he must also attribute to them the ability to “process information,” which means that they must “interpret stimuli” and form “representations” (Gaukroger 2002: 203). This reconstruction relies on intuitions

about what is needed “to explain animal cognition, not explain it away” (p. 200). It renders animals as “sentient but non-conscious automata” (p. 203). Animals are sentient in virtue of representing and interpreting stimuli; non-conscious because, lacking a mind, they lack human rational capacities for reflection; and they are automata because their sentient states are actualized in a mechanistically conceived material body that lacks an immaterial mind.

My alternative reading is that Descartes restricts genuine representation and cognition to human beings, in virtue of their exclusive possession of minds. Descartes explains the apparent phenomena of animal cognition by appeal to non-intentional, mechanistic processes. On this view, he interprets the processes in animal sensory systems as complex material causes. The retinal image and the counterpart brain images (which Gaukroger sees as representations) are material patterns that enter into the blind associative processes of material memory (Descartes 1998: 150–2; AT 11:177–9). Descartes “explains away” the Aristotelian’s attribution of genuine cognitive states to animals, but he still aims to *explain* the behavioral capacities of animals in non-cognitive fashion. I recommend this interpretation as the one most consistent with Descartes’s firm distinction between mind and matter.

Descartes’s Legacy

Descartes’s philosophy left a dual legacy regarding psychology and the theory of mind. Through the doctrine of mind-body dualism and the attendant unification of mental phenomena as those within conscious awareness, his philosophy encouraged the notion of phenomenal access as a defining feature of the mental. Through the doctrine of the animal machine, it almost diametrically led to a materialistic conception of animal and then human psychology and was an ancestor of early twentieth-century behaviorism. Let us consider this second aspect first.

Descartes’s doctrine of the animal machine was part of his larger naturalist cosmogony. Although the idea that the world developed out of particulate matter in motion had been broached by the ancient atomists, Descartes gave it real flesh, in his *World* and in Parts Three and Four of the *Principles*. The natural development of the solar system and of the Earth’s geological features became an immediate object of debate and further research (Roger 1982). The natural development of living things out of the Earth was taken up and developed in the eighteenth century (Vartanian 1953: 273–88). Hume, citing the Epicurean (hence Lucretian) cosmogony, contended that a process equivalent to ends-selection could explain the “uses of the parts” of plants and animals and the apparent “adjustment of means to ends” of those parts (Hume 1977: 184–5). Whether or not Descartes was aware of (or would have chosen) ends-selection as an explanation for the functional unity of organisms, later authors were (and did). Eventually, Darwin argued convincingly that natural selection can explain the adaptedness of organisms. Even so, the proper interpretation of immanent teleology in contemporary descriptions of organic functions remains under discussion (Ariew, Cummins, and Perlman 2002).

Descartes’s conception of the animal machine was an important precursor to La Mettrie’s *Man a Machine* (1994), and to the materialism of Diderot and other French

philosophes (Vartanian 1953: 221–46). Thomas Willis (1971) prepared the way by asserting that purely material animals possessing a soul of fine matter could exhibit sentience, thereby rendering the animal machine sentient. La Mettrie and Diderot proposed that human beings might be wholly material entities that are conscious and rational. The materialistic claim that mental states can be reduced to (or perhaps identified with) material states has subsequently gained adherents, although the topic remains under investigation. Substance dualism is now in demise, but the reason is not that materialists have shown how to explain consciousness and mental representation on their terms. Indeed, there is no currently accepted physical or material explanation of conscious sensation, mental representation, or conceptual thought. Whether there can and will be such an explanation is under dispute, and will remain so until such a time (if ever) that the mind-brain problem is solved.

Descartes's dualism started yet another thread in the history of psychology. Many eighteenth-century investigators of sensory perception adopted a kind of "empirical dualism" of mental and physical phenomena, leaving the metaphysics of mental substance aside (Hatfield 1995). They were inspired by Descartes's example that the psychological processes of depth perception might be explained by taking both physiology and mentalistic psychology into account. His conception that the mind-body union is explanatorily relevant to sensory perception encouraged investigators to search for empirically based descriptions of mind-brain relations (Hatfield 2000).

The merging of these two streams in the nineteenth and twentieth centuries led to further questions about the definition of the mental and the adequacy of non-mentalistic psychology. The behaviorists J. B. Watson and B. F. Skinner sought non-mental explanations of all animal and human behavior. E. C. Tolman challenged this project from within, as did Gestalt psychology and subsequent perceptual and cognitive psychology from without (O'Neil 1982: ch. 9). At the same time, physiological psychologists were referring to Descartes's animal machine and concluding that consciousness is not a necessary concomitant of all psychological capacities, including habit formation and the sensory processes that precede conscious sensory experience (Huxley 1884). One model treated the underlying processes as reflexive and mechanistic, echoing Descartes's animal machine. Another view suggested that non-conscious processes might nonetheless be mental, that is, they might include representational content that was combined according to innate or learned psychological mechanisms (Hatfield 2003b). Representation is here divorced from consciousness.

Morally, we can ask whether Descartes's animal-machine hypothesis left a legacy of cruelty toward animals. His follower Malebranche is said to have been indifferent to the squeals of animal pain that he induced by kicking a pregnant dog while remarking that animals are insentient machines (Rosenfield 1968: 70). Some Cartesians used Augustine's theological finding that an innocent newborn is undeserving of pain and suffering to support the animal-machine hypothesis. Owing to the Fall of humankind, human infants are not innocent and so their pain is just. Since other animals are born innocent, they do not deserve to suffer, hence they are insentient and don't suffer (Rosenfield 1968: 47).

Descartes himself had a dog (AT 5:133), but this fact provides no grounds for suggesting that he didn't really believe that dogs lack feeling. In the decades following Descartes's death, the most compelling argument for the sentience of animals was one

he raised and rejected (2:162; AT 7:231; 3:99; AT 2:39): their organs are analogous to ours, and we are sentient (Pardies 1972).

If we accept that Descartes's animal-machine hypothesis is understandable given his other philosophical commitments, we can nonetheless find implausible his view that animals lack feeling and basic cognition. That finding is consistent with the conclusion that the hypothesis was part of an intellectual program that spurred further growth in philosophy and psychology. Even as the tenets of that program have been progressively abandoned, the questions and problems that it raised remain in play.

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Chapter 25

How to Engineer a Human Being: Passions and Functional Explanation in Descartes

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Descartes was hardly the first philosopher to discuss the emotions, nor even the first to treat them under the rubric of the “passions.” First in the guise of the Greek *pathos*, and later as the Latin *affectio*, *perturbatio*, or *passio*, they occupied an important place in ancient and medieval philosophy of mind and action, ethics, rhetoric, medicine, and biology. But Descartes gave a new impetus to philosophical investigation by identifying passions as kinds of *perceptions* – perceptions generated in the body, but perceived by the mind. Descartes specifically characterized the passions as “those perceptions, sensations, or emotions of the soul which we refer particularly to it, and which are caused, maintained, and strengthened by some movement of the spirits” (1:338–9; AT 11:349). Although including “sensation” and “emotion” to indicate that they disturb the soul, Descartes’s main focus was on how the passions are *received* into the soul as perceptions. Our dispositions to receive such perceptions are, he maintained, inherently and highly functional. This is a crucial point, one which divides most seventeenth-century philosophers into two camps: those, such as Nicolas Malebranche, who follow Descartes in attributing at least an in-principle functionality to the passions, and those, such as Thomas Hobbes and Baruch Spinoza, who deny the applicability of such notions to the passions altogether. Despite a widespread popular picture of Descartes as a thoroughly bloodless philosopher, his approach set the terms for several generations of lively philosophical debate over the passions.

Indeed, Descartes grants the passions a scope and importance matched by few other philosophers. His last finished work, *The Passions of the Soul*, is devoted to showing the role of the passions in our practical reason, in the exercise of virtue, in physical and psychic health, in physiology, and in forming mind-body union. Other works explore yet other issues: Descartes’s correspondence with Princess Elizabeth of Bohemia in 1643 and 1645 discusses whether the passions impugn the freedom of the will; the *Description of the Human Body* considers the “humours,” while the dialogue *The Search After Truth by Means of the Natural Light* considers the passions’ role for right reasoning and method; the passions complicate and enrich the ontology of *The Principles of Philosophy*; and they are a major issue for the philosophy of mind developed throughout Descartes’s writings.

All of this is part and parcel of Descartes’s general interest in what we can call the “body-based” perceptions, that is, those perceptions generated by various movements

in our bodies: these include sense-perceptions, dreams, certain kinds of hallucinations and imaginings, and passions. Much of the spur for Descartes's interest comes from the foundational project laid out in the *Meditations on First Philosophy*, particularly that of justifying our innate, God-given faculties. Because God is its source, whatever truly belongs to our nature is trustworthy, even authoritative, when used properly. Although just what constitutes our nature and its uses needs clarification, our native dispositions to receive perceptions from the body are surely part of our nature, and so Descartes maintains that they tend to contribute to our well-being. Nonetheless, our body-based perceptions pose distinctive difficulties for this strategy, and in the face of these difficulties, Meditation Six introduces the novelty of genuinely *functional* explanation, which accounts for the material operation of useful dispositions in purely mechanical terms.¹ Descartes develops this approach specifically for the "internal sensations," such as hunger and thirst. But once in place, it provides the framework for addressing body-based perceptions in general, and the passions in particular.

The Rejection of Teleology and Its Limits

If a person should turn by chance into a watchmaker's shop and, thinking to inform himself concerning watches, should inquire of what metal or what matter each part was composed, what gave the colours or what made the sounds, without examining what the real use was of such an instrument or by what movements its *end* was best attained and its perfection acquired, it is plain that such an examiner as this would come short of any understanding in the real nature of the instrument. Should a philosopher, after the same manner, . . . discover only what effects each passion wrought upon the body . . . [he would not contemplate] the man, *as a real man and as a human agent*, but as a watch or common machine. (Shaftesbury 1999: 131)

Writing in the early years of the eighteenth century, the Earl of Shaftesbury identifies Descartes as the chief culprit in failing to appreciate the ends and purposes served by the passions. But whereas Shaftesbury may err in taking Descartes's account to be merely mechanical, talk of Descartes's functionalist approach may seem to stray too far toward teleology. For Descartes is famously suspicious of teleological explanation, particularly when it posits irreducibly purposive causes to account for how things acting within physical systems move. Such appeals are, he maintains, typical of the obscurantist stratagems of Aristotelian-Scholastic explanation. Instead, Descartes invokes a kind of epistemic modesty: "I consider the sort of cause which is customarily derived from an end to have no use in physics; for it is not without rashness that I think myself capable of investigating the ends of God" (2:39; AT 7:55).

The rub is that the recommendation of modesty is itself motivated by the theodicy of the Fourth Meditation, where Descartes elucidates the idea of God's infinite goodness with the proviso that understanding God's purposes will often be beyond our ken. So the very project of theodicy that prompts the turn to functional explanation in Meditation Six seems to doom all talk of purposes from the start. In fact, though, Descartes's main objection to teleology and associated forms of explanation is directed at their use in *physics*: "we will never derive any explanations concerning *natural* things from the ends that God or Nature had in creating them" (1:202; AT 8A:15; trans. alt.).

The Fifth Replies uses just these grounds to distinguish the sorts of conjectures appropriate to ethics from the explanations of physics, which must rest on “the most solid [*firmissimis*] grounds” (2:258; AT 7:375; trans. alt.), which give knowledge of “the thing itself” (see 3:341; AT 5:158). The *Meditations* and the *Principles of Philosophy* maintain that the nature of physical things is simply to take up (or push out) space, and their distinctive properties are all modes of extension. This stripped-down ontology allots an explanatory role only to mechanical causation: that is, to efficient causation restricted to transfers of motion from one part of extension to another as determined by shape, size, (relative) position, and motion. Extended things do not have purposes, only “tendencies” to motion.

But purposes *within* the physical world are one thing, purposes *for* the physical world are another. Descartes admits that God may have purposes motivating the creation of nature, even though God’s “incomprehensible” infinitude puts us in no position to speculate on any Divine blueprint. Still, locating purposes in God’s mind is not conceptual nonsense in the way that attributing them to a stone would be: minds are where purposes can get an ontological grip. Descartes’s campaign against teleology, then, has two planks: epistemic modesty prohibits global accounts of purposes, whether attributed to minds or bodies.² Even more fundamentally, ontological considerations militate against assigning purposes to bodies. What this leaves open is limited and proximate appeals to purposes rooted in the intentionality of minds. So, we can admit that the whole of God’s nature and plans are beyond our comprehension, while also seeking insight into God’s purposes in those *local* cases involving minds.

Reconciling God’s Goodness with Misjudgment and Misperception

That is just what the Fourth Meditation does in addressing our propensities for theoretical misjudgment. The problem is straightforward: God has the power and the will to make me and my faculties “perfect of [their] kind” (2:38; AT 7:55). Yet I make mistakes. Now, these statements may be reconciled if my seeming intellectual “imperfection” did, in fact, contribute to the perfection of the whole, which Descartes (reluctantly) admits is possible. But neither piety, nor the search for enlightenment is satisfied merely by admitting a remote possibility. Instead, we should seek to tailor our understanding of perfection both to the clear and distinct (though not adequate) idea of God’s infinite power and goodness, *and* to the facts about our nature. Descartes’s next line of defense, then, is to identify what parts of our nature provide the opportunity for error, which he finds in the interaction of will and intellect in forming judgments. We err when we willfully commit ourselves to that which we have failed to understand fully – something we will readily judge to be an abuse of both will and intellect. So, our errors originate not in anything positive in our natures, no error-producing *faculty*, but from carelessness and misuse of our faculties.

Even so, puzzles remain. Why did God not equip me with a fail-safe device against misjudgment, either by endowing me with clear and distinct perceptions of whatever matters might come my way, or by impressing “it unforgettably on my memory that I should never make a judgment about anything which I did not clearly and distinctly

understand" (2:42; AT 7:61)? Why too are we prone to a "certain weakness" that makes us careless even about our recognized principles of judgment? To these worries, Descartes falls back to some extent on the incomprehensibility of God's ends. But that in turn is used to revamp our notion of our own "perfections," so that "man's greatest and most important perfection is to be found" in our capacity for recognizing and correcting our mistakes (2:43; AT 7:62). Indeed, insofar as we develop our capacities for self-correction by identifying what gives us the opportunities for error, our insights into ourselves allow us not merely to avoid error, but to generate positive knowledge. In this way, our corrigibility indicates our perfectibility. This is Descartes's ultimate trump card in the defense of our nature.

But flashing this trump card in the Fourth Meditation does not yet end the story. For we are prone not merely to errors in judgment, which generate "formal falsity," but also to certain kinds of "perceptual" error, or misrepresentation. Our body-based perceptions, in particular, provide material for error. They do so by presenting misleading pictures of the world that tempt us into erroneous judgments. Here there is error enough to go around. We are responsible for formal falsity by overreaching our faculties, but our perceptions furnish us with the material basis for misjudgment, independently of our wills. So, the fault seems to lie as much in our stars as in ourselves: we are saddled with an intrinsically flawed perceptive faculty.

Recognizing the extent of the problem requires the conclusion of the Fifth Meditation that the essence of extended things is just extension and its modes, as well as the Sixth Meditation demonstration of their existence through the causal link to our perceptions. That leaves us in a pickle: since God is a straight shooter, extended things must exist – but since God is a straight shooter, they cannot exist *as we perceive them*, for our sense-perceptions (and other body-based perceptions) have qualities that cannot be squared with the clearly and distinctly understood nature of extended things. Descartes's general strategy remains the same as before: I must concede that it is impossible that there be "any falsity in my opinions which cannot be corrected by some other faculty supplied by God" (2:55–6; AT 7:80). But suspending judgment, as the Fourth Meditation recommended, does not suffice for correcting *material* misrepresentation in our body-based perceptions. Nor does it explain why our body-based perceptions set such snares for us in the first place.

Our native dispositions for body-based perceptions are many: we naturally experience pains, and pleasures, "hunger, thirst and other such appetites, and also . . . physical propensities towards cheerfulness, sadness, anger and similar emotions" (2:52; AT 7:74), as well as sensations of "extension, shapes and movements of bodies," "sensations of their hardness and heat, and of the other tactile qualities," and "sensations of light, colours, smells, tastes and sounds" (2:52; AT 7:75). These ideas are doubly innate: we are endowed with the dispositions to receive them and we receive them without tutelage, from the very start of our lives. For this reason, our mistakes trace a natural history, running from our innate propensities to experience such ideas to our seemingly innate tendency to form common-sense, but erroneous beliefs on their basis (2:52–3; AT 7:75–6). But natural though this history may be, it still contains room for self-correction. True, our disposition to experience body-based perceptions is inborn. It is even, in some sense, incorrigible: we cannot train ourselves *not* to have such experiences, and our experience does not track changes in our judgments about the

constitution of what we experience. We can, however, correct our understanding of “what nature teaches us” in experiencing these dispositions. For it is a mistake, indeed a misjudgment, to think that our body-based perceptions naturally dispose us to form beliefs about how the external world stands independently of us. Notice that Descartes does not argue that our perceptions teach us nothing at all: perceptions are always somehow *about* something, which they present *as* such-and-such. In this sense, our perceptions have representational contents independently of judgment, and we have inherent dispositions for certain kinds of representations. Nevertheless, that does not mean that we cannot mistake what, how, and to what ends those perceptions represent. Such mistakes may be well nigh universal, without thereby qualifying as teachings of nature – without ceasing to be *our* mistakes.

Now, Descartes does not deny the truth of many commonplace beliefs, e.g., that we experience sensations on account of our bodies. Nor does he dispute the supposition that other bodies “are the source of these various sensory perceptions [and] possess differences corresponding to them, though perhaps not resembling them” (2:56; AT 7:81). We are naturally disposed to believe both claims, and no higher considerations force us to reconsider our views. These assumptions, then, truly count as “what my nature teaches me.” However, my clear and distinct understanding of the nature of extension rules out taking many sensations as even *possible* modifications of extended things. Since they are not of the same ontological kind, to assume that they somehow resemble the modifications of extended things is rash, even meaningless. All I am entitled to believe is that nature teaches that my sensations *correspond* to modifications of extended things. Unfortunately, that still leaves us with no explanation of why we experience them as we do. Without an alternative explanation, our rash assumptions may not seem particularly rash at all.

Instead, Descartes asks us to revise our estimate of the sort of compulsion we feel when we experience such perceptions. Much as did Galileo before him, Descartes assimilates those (seeming) “aspects of corporeal things which are either particular . . . or less clearly understood, such as light or sound . . . and so on” (2:55; AT 7:80) to “sensations of pain, hunger, thirst and so on” (2:56; AT 7:81). Now, we are not so careless as to think that the pain we feel when poked with a sharp stick is somehow a property of the stick. What nature teaches us is rather different: “to *avoid* what induces a feeling of pain and to *seek out* what induces feelings of pleasure, and so on” (2:57; AT 7:82; emphasis added). What we experience, then, is not so much a neutral picture of the world as a set of road signs and traffic signals. If we try to read the independent structure of the world directly off these practical directives, we do violence to the very experience of the sensations themselves, and “pervert the order of nature” (2:57; AT 7:83; trans. alt.). That is, we *invert* the order of explanation: sensations do not represent independent external things, which happen to act on the body; rather, they represent how external things are acting on the body – from which there is no easy inference to their intrinsic natures. Yet sensations represent by presenting what they present as if it were proper to external things. This kind of misrepresentation may well be part of their functionality, however, for their goal is to prompt us to act on and in the world, and that requires presenting at least some information about the world, e.g., “that there is something in the [stick], . . . which produces in us the feelings of . . . pain” (2:57; AT 7:83).

Our sensations, in fact, do double duty: they present information about the world and they guide how we act on that information. That duality can be a source of confusion. On the one hand, the quality by which they represent how things affect the body has an intrinsically motivational character: it signals the actions we should take in the face of what is happening in and to our bodies. Because of their simplicity, pains and pleasures exhibit this signaling quite clearly: they motivate us to shun or pursue – indeed, they seem little more than such signals. Descartes’s innovation is to consider all sensations not clearly and distinctly perceived as modes of extension to be similarly practical signals about our situation. On the other hand, sensations must tell us *something* about the world – at least about its nearby parts – in order to inform us how to undertake the actions they signal us to take. They are replete with information, but information selected for and filtered by practical goals. The trick for us is to learn how to read this information by sorting out what belongs to the signal and what counts as information about the world.

So, the defense of our sensations and other body-based perceptions rests on their status as practical guides for maneuvering our bodies through the world, while preserving their integrity, and thereby safeguarding the union of mind and body. Although a being outfitted with sufficient physiological and physical knowledge might be able to reason from the state of the world to an appreciation of what would preserve the integrity of its body, we finite creatures, newly minted at birth, would be long dead before we amassed a fraction of the theoretical understanding necessary for such reasoning. That is why we come equipped with the dispositions we have: they form a ready response system, which must operate from the very start of our lives, at high speed, and in ways that will compel our attention – even at the risk of theoretical misunderstanding.

The Clock Analogy and Engineering the Body

But the defense is not out of the woods yet. For at least some of our dispositions seem to fail the practical test: the misleading thirst of the dropsy-afflicted or the phantom pain of the amputee are not functional, but dysfunctional. Dropsied perceptions and phantom pains intrinsically misrepresent the relations we bear to various things as helpful or harmful. This is a practical misrepresentation, which may motivate us to actions that harm the integrity of the body, or at least, waste our efforts. Such perceptions are typically signs of ill health. But insofar as our bodies are susceptible to illness and damage, and we are prone to dysfunctional perceptions, there seems to be a real “error of nature.”

To address this last problem, Descartes makes perhaps his most ingenious move: he restates the problem by analogy to the workings of a clock. As does a clock, we have certain ends. Those ends make a clock what it is; in some sense, they constitute its “nature.” In similar fashion, we may say that our ends are in our nature. But just as a badly broken clock fails to keep time, the dropsy sufferer fails to take those actions that preserve the integrity of the body. There is something in the makeup of each that betrays the ends it is supposed to have “by nature.” Here, however, Descartes insists on a point later made by Hume (1978: 132): there is no miraculous lapse in

the universal laws of mechanical causation. The broken clock and dropsy sufferer follow all the same natural-causal laws as do functioning machinery and healthy drinkers. In *this* sense, then, they are following their inherent nature; they cannot help but do so. We are left with two very different senses of “nature”: one referring to the “ends” that allow us to identify the thing as the kind of thing it is, the other to its status as an extended, physical thing. Alas, what generates the error seems to be what is truly intrinsic to the things: their configuration of parts, which belongs to their “nature” in the second sense. And so, to talk about an “aberration” in the nature of the broken clock or the ill person, because they fail to fulfill what *we* take to be their ends, is to apply an “extrinsic” denomination depending on our thought (2:59; AT 7:85; trans. alt.).

These two senses of nature arise from considering the clock under two different descriptions: either as a piece of machinery designed by humans, or as a configuration of extended, moving parts. The latter has a strong claim to being basic, since the only properties we can find *in* the clock that enable it to serve any use lie in its configuration of parts. As such, the clock is properly understood as a configuration of extended parts, which happens to be pressed into service by humans, who manipulate it to serve an extrinsic end. But no matter how ingenious a clock design we may create, it cannot contravene the nature of extended nature. Neither can our bodies; they are always composed of extended parts, and divisible into further extended parts, all of which follow purely mechanical laws of motion. Whatever goes on when we are ill or damaged is explained just as fully by those laws as what happens when we are in working order.

But just for that reason, we should not dismiss “extrinsic denominations” out of hand. If, for instance, we restrict description merely to our bodies’ physical makeup, we may be unable to distinguish between a diseased and a healthy condition. More generally, description restricted to the physical makeup of the world may rob us of much of our ability to differentiate our bodies from the rest of extension in any well-founded way.³ And however “extrinsic” the normative description of our bodily nature in terms of health and preservation may be, it still applies to our bodies – just as the functional account applies to a watch. Extrinsic denominations are not *ipso facto* false or inapplicable. They only mislead us if we think they describe the thing’s *internal* constitution and operation, including the laws of motion that govern the conservation and transfer of motion through its extended parts. We can configure pieces of extension, or try to configure them, so that their natural law-governed internal operations end up serving our purposes. What we cannot do is to configure pieces of extension so that they *have* such purposes themselves. That is why there are genuine engineering problems for building machines: we need to figure out how to arrange extension so as to press its motions into our service, and make it functional, without ever being able to make extension *intrinsically* purposive.

The explanation of our body-based perceptions must consider how they are engineered. The explanation of the *origin* of their functionality may indeed be teleological, since it lies in God’s purposes in constituting our natures. But once we have established that our perceptions do serve some ends, we can explain their functionality without reference to the teleologically driven story of their genesis, simply by way of the mechanical operations of bodily mechanisms. This is truly functional explanation, and

it provides the last piece in Descartes's theodicy, by showing how we qualify as masterworks of good engineering without introducing any robust teleology, or faltering on the possibility of occasional misrepresentation. Because matter is blind to purposes and intrinsically divisible, its mechanical operations are always subject to disruption.

In this context, we can consider our bodies to be well engineered if they operate to present us with the sorts of perceptions that are functional under standard operating conditions. Now, the sorts of non-standard conditions that Descartes considers in the Sixth Meditation concern what is internal to the body, e.g., introducing a pathogen in the case of dropsy, or breaking the usual terminus of our nerves in the case of phantom pains. These conditions provide the environment in which the brain and pineal gland operate, one that puts them on the receiving end of a deviant causal chain. For Descartes's purposes, a causal chain counts as deviant when it happens to produce perceptions that fail to represent the causal chain properly, for instance, by causing motions that prompt us to feel pain "in" our hand, when there is no danger to our hand, or no hand to be endangered. What a good engineer must do is to anticipate how the machine will run in the situations for which it is designed *and* to design it to operate in the situations in which it will usually be found, thereby minimizing the chance of suffering deviant causal chains.

That is exactly what God has done (1:60–1; AT 7:87–8); indeed, God has gone a step further. For we are not merely equipped with what proves to be a good design, our good design works to preserve the standard conditions under which it is designed to operate. Of course, it doesn't always succeed: disease happens, damage happens, deterioration happens. That we are so susceptible is probably no more than a matter of our finitude (a point later made by Spinoza 1985: 547). Still, a truly inspired design should contain the capacity to diagnose our condition and to correct it when necessary. Such a self-diagnostic system, of course, would itself be vulnerable to malfunctioning. But by operating independently of other systems, it could provide a check on them.

Our engineering is self-maintaining in just this way. Indeed, it even allows self-correction. The Sixth Meditation presents several of the self-diagnostic resources at our disposal: the interaction of our sense modalities, our memory, and above all, our intellect, "which has by now examined all the causes of error" (2:61; AT 7:89). This is analogous to the use of our intellect in correcting our theoretical judgments. Although we are always capable of careless judgment, we also have the ability to learn about our faculties, and to train ourselves to use them properly. Similarly, we have the ability to learn about our dispositions for body-based perceptions, particularly about the mechanical operation of the bodily systems underpinning their functioning. This knowledge is itself a powerful and flexible tool for self-diagnosis and self-correction. The Sixth Meditation ends with one example of this capacity: a test to distinguish between waking and dreaming, in which we use our memory to measure the connections and coherence in our experience (see 2:61; AT 7:89). The lack of the usual coherence marks the deviant (though innocuous) causal chain that produces dreaming experience through motions in the brain operating in the absence of their usual external causes. In general, the insights the *Meditations* provides into the nature of extension, the mechanical operations of our bodies and sense-organs, and the relational, interest-sensitive character of our body-based sense-perceptions should enable us to use our perceptions to

diagnose our own conditions of operation and to develop yet further self-diagnostic and therapeutic capacities. In this respect, Descartes had great hopes for the progress of medicine; learning how to treat illness and maintain health just is developing our capacities for self-diagnosis, self-maintenance, and self-correction.

The Special Place of the Passions

Nonetheless, the exigencies of bodily preservation require that there be at least some rudimentary way of checking that our perception is operating functionally from the moment our bodies are up and running. This may be the particular province of the passions (see Rorty 1992). Since the passions are a species of body-based perception, they will be functional in the way in which *all* body-based perceptions are functional – for the preservation of bodily integrity, and hence of mind-body union. Diagnosing the current condition of the body, and the conditions in which it operates, is itself part of this general functionality. The passions, especially when considered holistically, provide self-diagnostic capacities for the functional system. This is not the only province of the passions: Descartes emphasizes that certain passions constitute the “sweetest pleasures in this life,” and as such, they are ends in themselves. Indeed, this may be why we count the preservation of bodily integrity, for which the passions serve as means, as an end in itself – because we experience it through those passions good in themselves (Rorty 1986; Schmitter 2005; Brown 2006: ch. 2).

In general, for our perceptions to function as practical guides, they must be more than just perceptions: they must motivate, or at least influence, actions. Most obviously, they do so by providing a direction of motivation founded on their intrinsically aversive or attractive character. Pains, pleasures, and appetites, such as hunger or thirst (and perhaps varieties of disgust), are characterized by this feature. *The Passions of the Soul*, while granting the passions a more complicated phenomenology, etiology, and structure than the appetites, supposes that the passions typically direct us somehow. This directedness is not the same as a desire, which is a distinctive passion (1:350, 358; AT 11:375, 392). But with the important exception of “wonder” and its species, all passions present an object as either good or evil; for example, we love what we think of as good, or beneficial, and we hate what we think of as evil, or harmful, and “the same consideration of good and evil is the origin of all the other passions” (1:350; AT 11:374). “Good” and “evil” here are relative concepts: something is good or evil *for us*, which we register as attraction or aversion.⁴ As “emotions of the soul which dispose it to pursue two very different things” (1:359; AT 11:394), attraction and aversion are simply *motions* – that is, directions of motivation.

In contrast, it seems much less plausible that the “great variety [of sensations] of colours, sounds, smells and tastes, as well as differences in heat, hardness and the like” (2:56; AT 7:81) intrinsically dispose us to pursue much of anything. These are sensations of what John Locke dubbed “secondary qualities,” and as we have seen, there was a venerable tradition comparing them to pains, pleasures, and appetites. But the point of the comparisons was to deny that such sensations presented properties intrinsic to the nature of bodies, not to assert that they were motivating. Although we may enjoy particular secondary qualities, such as the sensation of sweetness, their pleasurable

aspects seem distinct from the sensations' essential nature. It is not conceptual nonsense to dislike the taste of sugar as it would be to dislike pleasure. And many sensations, e.g., a sensation of mauve, seem motivationally neutral. Instead, sensations of this sort simply map "differences [in the bodies that are their source] corresponding to [the sensations], though perhaps not resembling them" (2:56; AT 7:81). Those differences in bodies may be important to our interests, but the sensations themselves do not indicate *how* they are important, or how we should act on those differences. Yet sensations of secondary qualities are exactly the sorts of body-based perceptions that call for a defense of our dispositions to experience them. Because they seem to "correspond" to differences in bodies, we may mistakenly suppose they resemble them, and thereby *project* them as properties intrinsic to bodies. The material for such theoretical errors, though, comes from their own intrinsic qualitative content. In this respect, pleasures, pains, and appetites seem much less misleading.

So the defense of our body-based perceptions trades on rather different aspects of sensations. To stand in need of a defense, sensations must tempt us into treating them as if they were their intrinsic properties of extended things. To make this temptation tractable to a solution, sensations must exhibit directions of motivation. "Sensations of . . . hardness and heat, . . . other tactile qualities, . . . [as well as] light, colours, smells, tastes and sounds" (2:52; AT 7:75) possess the first trait, but usually lack the second. Pains, pleasures, and appetites possess the second, but have little of the first. Yet the Sixth Meditation lumps them all together.

The passions, however, manifest both traits. On the one hand, they possess the directedness that pains, pleasures, and appetites have. Indeed, they seem to offer much more fine-grained motivations than do simple pains, pleasures, or appetites. The latter provide pushes and pulls that may differ in objects and degree, but in little else. Passions, however, come in many different *kinds*: Descartes counts six "simple" ones and "innumerable" others. Each can take different particular objects and direct our actions vis-à-vis that object in a highly specific and sometimes complex way. On the other hand, passions also prompt us to project qualities onto their objects. They do not tempt us, as sensations do, to project the subjective state itself onto its extended object: when I fear a polar bear, I don't take my fear to be a property *of* the polar bear. But fearing the polar bear does involve perceiving the polar bear as dangerous, that is, of attributing a property, quality, or value to the polar bear, which can be a source of error (1:377; AT 11:431; cf. Malebranche 1997: 370). This may be one reason why Descartes refuses to identify the "emotion" of attraction and aversion with the object of good and evil (1:359; AT 11:394).

Moreover, the passions not only possess the features of body-based perceptions demanded by Descartes's defense, they link the problematic feature, the representation of the object, to the functional one, the motivating quality. Most passions present their objects as good or evil. Wonder and species of wonder do not, but they do present their objects as being *something* – as novel, significant, and worthy of attention, even if only by their extreme triviality (1:353; AT 11:380). Those qualities that are represented as belonging to the object, however, are relational qualities. So to perceive the polar bear as dangerous is to perceive the polar bear as harmful, or evil-for-us. This makes sense: the passions are guides for action, and for the sake of action, what counts are relational properties. But Descartes, like many early modern philosophers, holds that relational

properties fail genuinely to inhere in the related objects. For instance, being 10 kilometers outside Paris is not an intrinsic property of any particular Peugeot. That the Peugeot can stand in such a relation, however, does rest on properties intrinsic to it – most obviously that it is a finitely extended thing that can move through and be located in space. The relational representational content of passions likewise builds on properties of their objects, indeed on quite distinctive and determinate ones. When my well-founded fear represents the polar bear as dangerous, the passion is a response to features properly attributable to the polar bear (size, claws and teeth, ravenous hunger), as well as to the other relevant conditions (the bear's proximity to me). The passion picks out such features to command our attention on the basis of our relational and pragmatic interest in preserving bodily integrity. In so doing, it conveys a great deal of information about its object; indeed, it can represent its object as having complex properties. For this reason, the passions can be much more motivationally fine-grained than the sometimes vague, sometimes confused imperatives of raw pains and pleasures: my fear of the polar bear prompts me to take evasive actions directed specifically at avoiding its teeth, claws, and ravenous appetite. And so the passions can be highly functional.

The complex representational content and motivational efficacy of the passions gives them a rich phenomenology and articulated internal structure. Although we often experience our passions confusedly, without distinguishing between the passion, its object and properties, the relation it bears to us, etc., there seems no reason in principle why we cannot disentangle these components, even in our *experience*. Moreover, our dispositions to experience passions are amenable to correction in a way that other perceptual dispositions are not, for we can alter and reform the bodily basis of our passionate susceptibilities. That does not seem possible with dysfunctional pains or appetites, or misleading sensations. True, Descartes holds that any disposition to experience a particular perception, rather than some other, rests in large part on the specific internal makeup of our bodies and of their mechanical operation. So correcting dysfunctional perceptions of any sort usually involves doctoring our bodies. But whereas dysfunctional pains, pleasures, appetites, and sensations arise because of some *abnormal* state of the body (i.e., disease or damage), dysfunctional passions are the lot of most humans. Correcting dysfunctional pains, pleasures, appetites, and sensations is the province of medical pathology; correcting dysfunctional passions is largely a matter of training, especially self-training and the exercise of “virtue.” Both medicine and the reform of the passions are therapeutic regimes that change the internal makeup of our bodies, and thereby alter the bodily basis for our perceptions. Still, the best we can hope for in the case of abnormal and dysfunctional dispositions for pains, pleasures, appetites, and sensations is to return to the default, “natural” dispositions. In the case of the passions, we can develop dispositions that are different, better, and genuinely more rational than the common run. So, whereas a disease-free, undamaged viewer in standard conditions unavoidably sees brown when presented with chocolate, we can train ourselves to correct our passionate dispositions, even to lose our fear in the face of (some) prospects of death.

Among our body-based perceptions, the passions are especially subject to normative appraisal of what we *should* feel: fear in the face of a nearby, free-roaming polar bear is appropriate; fear of a child's stuffed bear is not. The passions are also uniquely sensitive

to judgments, just because they attribute significant properties to their objects and to the relation the objects bear to us. Realizing that I am faced not with a ravenous, uncaged polar bear, but instead with a stuffed animal (or hologram, or trick of the light), I breathe a sigh of relief *and my fear dissipates*. In this way, perfectly run-of-the-mill corrections that compensate for errors of fact can readily alter our experience. We can also affect our passionate experience by refining our judgments about what is truly beneficial or harmful to us, e.g., by reflecting that animal-shaped toys are rarely a threat. But although our passions are sensitive to judgments of various kinds, they are not always *immediately* sensitive (even to judgments of fact), and so retraining our emotional dispositions usually requires a good deal of work. To affect our experience of a passion, a judgment must affect our body-based perception, in particular, by changing the course of the animal spirits through the brain. And to alter our dispositions to experience various passions, a judgment must affect our dispositions for perception. Those are bodily dispositions, and that means that judgments (or reason) can correct our dispositions to experience passions only by somehow engaging our bodies through specific techniques (see Rorty 1992; Schmitter 2005). But such techniques allow us to change the entire dispositional system of the passions. As such, the passions are uniquely amenable to sustained efforts at correction, and seem paradigmatic for Descartes's defense of our nature. But Descartes doesn't address the special "perfection" of the passions explicitly until after a lengthy correspondence with Elizabeth of Bohemia started in 1643 spurs him to write the *Passions of the Soul*. That is where Descartes develops the fullest account of the functionality of the passions.

The Structure of the *Passions of the Soul*

The *Passions of the Soul* comprises three main parts: the first treats "the passions in general and incidentally the whole nature of man," while the second turns to the "number and order of the passions," especially of the six "primitive" passions (i.e., wonder, love, hate, desire, joy, and sadness). Last comes an account of "specific passions," which are either compounds or species of the previous six, focusing on "generosity." Despite a somewhat erratic appearance, the text is largely organized around Descartes's functional approach. Part One locates the passions by describing the distinctions and relations between body and soul through the activities proper to each. Particularly important here is the account of the mechanics by which external things act on our sense-organs and transmit motions to the pineal gland. Such motions do not themselves constitute perceptions, for as Descartes emphasizes, perceptions are "functions" of the soul (*fonctions*, 1:328; AT 11:328, here simply "activity" or "operation"). But they can *cause* perceptions. Perceptions caused by bodily motions constitute a proper class and one sense of "passion"; with the exception of some voluntary imaginings, they are just those perceptions I have been calling "body-based." Among body-based perceptions, Descartes distinguishes those that we refer to external objects (sense-perceptions), those we refer to the body (appetites, pains, pleasures, and certain feelings of heat and cold localized in our limbs), and those we refer to the soul (passions in the narrow sense). The whole classification is captured neatly in Descartes's specific definition of the passions of the soul: "those perceptions, sensations, or emotions of the

soul which we refer particularly to it, and which are caused, maintained and strengthened by some movement of the spirits" (1:338–9; AT 11:349). The term "spirits" stems from Galenist medicine, but is used here simply to indicate fine, fluid parts of the blood, which have been rarified by the heart and brain, and can pass through the brain by way of the nerves to produce muscle motions (1:320; AT 11:248). Because they involve the spirits to sustain perception, the passions count as body-based, and much of Part One of the *Passions* explains the mechanics by which they operate.

Part One ends, however, with a short discussion of the interaction between volition and passion, and the problems we face in shaping our passions to be responsive to the actions of the soul (i.e., volitions and reasoning), so that our actions will be in conformity with our considered rational judgments. Lacking such responsiveness constitutes one kind of weakness of will, for we will be motivated to some end other than what we rationally recognize to be the good. Descartes emphasizes that in such cases there is no conflict between "lower" and "higher" parts of the soul, and rejects the ancient and influential organizing distinction between "irascible" and "concupiscible" passions, i.e., between first-order appetitive passions and those passions directed at the first and capable of checking them. Instead, Descartes explains that "conflict" arises simply when the motions of the spirits oppose motions originating from the soul's body-directed volitions. There are two sources of motions, both of which can initiate maneuvers of pursuit or aversion by directing the flow of spirits in the pineal gland. The specific difficulty is to ensure that the end results of these motions are actions in accord with our reason. This is what Descartes means by gaining "control," or even "mastery," over our passions (1:348; AT 11:370).

This issue of "control" is related to the issues we have already seen in Descartes's clock analogy. It arises because the bodily motions that underpin our passions are only indirectly responsive to our wills. But whereas we can directly tinker with a clock's internal parts, Descartes does not seem to countenance the possibility of our playing clock-maker to our own bodies and brains. Instead, in Part One, Descartes insists that we use the actions and perceptions of the soul to work on the mechanical structures of our bodies that shape how the motions of the passions impact the pineal gland. This work in "training and guiding" our passions is subsumed in Part Two under the "exercise of virtue" (1:381; AT 11:441). The exercise of virtue both requires and constitutes a discipline analogous to the self-correcting strategies we've seen before. The *Passions of the Soul* develops an increasingly refined account of this discipline in the concluding sections of each part, presenting a "general remedy against the passions" at the end of Part Three (1:403; 11:487).

Part Two addresses how the passions make "reference to the soul." The exact meaning of this phrase is murky (see Brown 2006: ch. 4), but at least part of Descartes's point is what we saw earlier: I do not attribute the passion *itself* to its object. When I feel fear of a bear, I do not think the bear is fearful. Nor, for that matter, do I attribute the fear to one or more of my body parts: I may feel the effects of fear in parts of my body, but it is the whole self that is fearful (1:340–1; AT 11:353–4). While every passion makes a reference to the soul, each also makes other kinds of distinctive attributions, which serve to differentiate one passion from another. Descartes lays these out in the "definition" of each primitive passion, followed by accounts of its "cause," its

bodily effects, and how the passion is “useful” and “harmful.” The definition characterizes the phenomenology – the qualitative “feel” – of each passion. But that is largely a matter of how the passion represents its object by presenting it under some evaluative description relative to us, as well as its effect on the will. All these features of the definition are correlated with bodily states and motions, which in turn are crucial to the passion’s function. Love, for instance, is “an emotion of the soul caused by a movement of the spirits, which impels the soul to join itself willingly to objects that appear to be agreeable to it” (1:356; AT 11:387), and “by joining real goods to us . . . makes us to that extent more perfect” (1:377; AT 11:432).

Towards the end of Part One, Descartes specifies the “principal effect of the passions.” It is to “move and dispose the soul to want the things for which they prepare the body” (1:343; AT 11:359). Part Two explains how the passions “move and dispose” us at two levels: as perceptions of the *soul*, they “dispose our soul to want the things which nature deems useful for us, and to persist in this volition”; as motions in the *body* sustaining the perception, “the same agitation of the spirits which normally causes the passions also disposes the body to make movements which help us to attain these things” (1:349; AT 11:372). Most importantly, changes in the heart and blood cause the spirits to course through our nerves to our muscles so that we may flee, fight, pursue, or undertake any of the other actions to which the passions motivate us. Again, wonder is the exception, since it does not prepare for either pursuit or flight. But it does invoke other bodily changes, particularly in the brain. Motions in the brain can affect attention, or produce new dispositions or memories. This is how wonder and its species work to fix an impression of the object in the brain (1:355; AT 11:384).

Such brain motions, whether prompted by wonder, by another passion, or by completely different mental acts or perceptions, are crucial for the bodily retraining we undertake in the discipline of virtue. Passions may also affect “downstream” bodily systems, e.g., the pulse rate, the amount and distribution of heat in the body, blood flow, appetite, the production of “humours” (another ancient medical term for kinds of bodily fluids), and so forth. In joy, for instance, “the pulse is regular . . . we feel a pleasant heat not only in the chest but also spreading into all the external parts of the body . . . [and] our digestion is less active than usual” (1:363; AT 11:402–3). These bodily changes can figure in the phenomenology of the passions if they are perceived, but they are more interesting for their further bodily effects. Most obviously, they produce outward signs and expressions: changes in body color, movements in the limbs (such as trembling, listlessness, or fainting), facial movements, and sounds (such as laughter, groans, sighs, and weeping).

These principal effects, and many of *their* effects, contribute to what Descartes identifies as the “natural function” of the passions: “to move the soul to consent and contribute to actions which may serve to preserve the body or render it in some way more perfect” (1:376; AT 11:430). The functionality of the passions’ movements need not stop with moving the soul: for instance, pleasant passions – those we are motivated to maintain – have the effect of promoting bodily health (3:250; AT 4:219–20). By the same token, unpleasant passions may have unfortunate consequences for bodily health (3:253; AT 4:236–7). Impairing our health is not exactly a *function* of these passions, but it is a *consequence* of the mechanism whereby they are functional: a passion of

sadness represents an object as harmful by lying in the causal chain by which that object produces harm in the body; to put an end to our sadness, we are motivated to disrupt that causal chain.

Other bodily effects of the passions may likewise be consequences of their functionality without themselves having functions. The various expressions of the passions are one example. Malebranche would later maintain that the expressions and other outward signs of the passions work “for the preservation of society and of our sensible being” by providing the means and media for communicating passions (Malebranche 1997: 377). But Descartes assigns them no function, instead treating them simply as side effects of the sustaining motions of the spirits (1:367–75; AT 11:411–29, but cf. Shapiro 2003). Such consequences of a generally functional system are rather like what has come to be known as “spandrels” in evolutionary theory (see Gould and Lewontin 1979). That is, they are by-products stemming from the ways in which genuinely functional systems have been engineered. They are not themselves functional – neither part of the design, nor developed through selective pressures – but as long as they are not highly dysfunctional, they do not constitute an unacceptable flaw in the system. Because Descartes is committed to functional explanation without teleology, he must allow that the mechanisms providing functionality always contain the possibility of by-products, spandrels, and unintended consequences.

Let us bear in mind the various bodily effects of the passions when we consider Descartes’s account of how virtue serves as a “general remedy against the passions” that brings them under the guidance of our reason (1:403; AT 11:485). Put so, Descartes looks like a moderate Stoic, recommending detachment from the passions (*apatheia*) to achieve autonomy and the good life. And he does advise us that when it comes to “the things which do not depend on us in any way, we must never desire them with passion, however good they may be” (1:379; AT 11:437). But despite valuing autonomy and mastery over one’s fate, Descartes also distances himself from wholesale Stoicism (see Descartes 1989: 130, n.42). Most importantly, he does not dismiss the passions as such: “for we see that they are all by nature good, and that we have nothing to avoid but their misuse or their excess” (1:403; AT 11:485–6). Indeed, the last word the *Passions of the Soul* gives on the passions is to call them “the sweetest pleasures of this life” (1:404; AT 11:488).

Most tellingly, the chief remedy for the passions is itself a passion: the “specific passion” of “generosity,” analyzed in Part Three of the *Passions* (see Shapiro 1999). The importance Descartes accords to generosity cannot be overestimated. It is both passion and virtue: the chief remedy for the passions and the keystone of the virtues. Generosity makes us feel esteem (a species of wonder) for ourselves, through recognizing our free will and resolving to use it properly. Because the only thing that truly belongs to us is “this freedom to dispose [our] volitions” (1:384; AT 11:446), the passion is simultaneously a product of, a means to, and a representation of the kind of autonomy Descartes values. Nonetheless, it remains a passion, “caused, strengthened, and maintained by movements of the spirits” – bodily mechanisms that are *not* directly under our control. So, on the one hand, developing the passion of generosity requires focusing on what is in our control; on the other, it is receptive to and dependent on what lies outside. This may simply be the lot of embodied humans, as Descartes comes to realize when pressed by Princess Elizabeth (3:262–3; AT 4:282). Like an engineer who struggles with

recalcitrant material, we seek to fulfill our purposes through a body embedded in the extended realm, a realm alien to and largely unmoved by intentions and purposes. But if this is the human condition, it is not a hopeless one: it requires that we learn to work with and through our bodies. In so doing, we achieve the kind of autonomy that comes from appreciating what truly belongs to us.

The discipline producing the passion of generosity has two prongs. First is the project of engineering our bodies so that they will be disposed to the right sorts of passionate movements on the right occasions. But as we have already seen, this is a highly indirect form of engineering; it proceeds through representing to ourselves those “things which are usually joined with the passions we wish to have and opposed to the passions we wish to reject” (1:345; AT 11:362–1). Such representations produce changes in the corporeal imagination and thereby redirect the flow of the spirits in ways that can literally rearrange the structure of our brains (see Schmitter 2005, 2006; cf. Hoffman 1991). Second, we must develop our reason, particularly the “firm and determinate judgments bearing upon the knowledge of good and evil” (1:347; AT 11:367). Such judgments are the “proper weapons” of the will, which allow it to “conquer the passions and stop the bodily movements which accompany them.”

These techniques cannot be practiced in isolation. Although the aim is to restructure our bodies so that our passions come to be in accord with our considered judgments, our judgments may likewise be shaped by the passions of our restructured bodies, especially where both judgments and passions bear on the resolve of the will. Such volitions themselves will produce bodily changes, and we may find that we need to adjust our techniques for correcting our bodily dispositions in light of how the motions generated in our bodies from different sources interact. Then too, we want our judgments about good and evil not only to be firm and determinate enough to provide resolve to the will, we also want them to be true – for both intrinsic and instrumental reasons (see 1:347; AT 11:367–8). Although the *Passions of the Soul* is mostly concerned with how rational judgments serve to reshape our passions, it does allow that “regret” or “repentance,” states identified with turbulent trains of passions, are pretty reliable signs of error (1:352; AT 11:377–8). And *The Search After Truth* suggests that the passions, as well as the “internal emotions” not generated or sustained by bodily motions, may serve as a check for our judgments (see Schmitter 2002).

The Need for a General Remedy

The “general remedy” provided by the discipline of virtue thus exploits all of the functional features of the system of the passions. But we may wonder why we need a general remedy at all. For the passions are “all by nature good.” Of course, like all body-based perceptions, they are prone to dysfunction under abnormal conditions, and so we may occasionally need a remedy, just as we occasionally need medical interventions to repair other perceptual dispositions. But that does not explain why Descartes insists on a *general* remedy. Nor does it explain why he singles out the passions as the kind of body-based perceptual disposition particularly in need of wholesale reengineering.

The answer, I think, lies in the particular passion of generosity, but to see why, let us consider some possible broad-stroke explanations. One is the view, later adopted by

Malebranche, that the good served by the passions, i.e., preserving bodily integrity and the union of mind and body, is simply not the same as the good for the soul alone, and pursuing the former stands in the way of pursuing the latter (see Malebranche 1997: 359). But this account won't really wash for Descartes, who was much less struck than Malebranche by how original sin had corrupted the mind-body union and set its ends against those of the soul. Descartes certainly allows that there are different sorts of goods, and that there are occasions when they conflict, e.g., when my intellectual desire to finish a paper conflicts with my passion for sleep. But that still won't explain the need for a general remedy.

Another, more likely explanation is that left to their own devices, the passions cannot steer us as precisely as they might. Despite the mechanical operations of their physiological causes and effects, the passions provide extremely fine-grained motivations. So too do our judgments. Bringing those fine-grained motivations in line with our equally fine-grained judgments may require frequent tune-ups. It seems unlikely that the mechanical structure our bodies originally have – or indeed could ever have – possesses the flexibility to produce just those passions appropriate to whatever situation we might find ourselves in (see 1:139–41; AT 6:56–9). Yet another, related possibility is that the appearance of “spandrels” resulting from our body mechanics will require that our responses undergo adjustments. Effects that may be innocuous in one set of circumstances may become dysfunctional in others. Even more, effects that were not originally functional might be reengineered to *become* functional: we might, for instance, manage our passions to harness their physiological effects to improve bodily health, even if that were not originally part of the “natural” function of the passions. In such cases, managing our passions will not merely remedy failings in the system, but improve its functioning by pressing by-products into serving our ends.

Important as this last point is, I do not think we will capture the nature of Descartes's remedy, or even what is plausible in these general explanations, without turning once again to how generosity is both a particular passion and a virtue. It is a virtue because it expresses our freedom and our resolution to use that freedom well. It is likewise a passion, because it uses the resources of the body to strengthen and maintain our resolution. Its value shows the value of developing our freedom and autonomy by working on and through our bodies in a process of self-shaping. That self-shaping and self-improvement, using all the resources at our command, may be the highest good for us as embodied creatures. If so, the system of the passions is exceptionally functional, capable of improvement both at the level of our understanding *and* at the level of experience. And the passions demand “remedy” less because they are generally flawed than because they are perfectible without limit.⁵

Notes

- 1 This may seem an idiosyncratic sense of “functional explanation,” but I think it is in the spirit of contemporary uses in biology: it makes functions *continuous* with mechanism, requiring that the operations of functional items fall under the covering laws of mechanical accounts.

- 2 The *Meditations* presents the argument from epistemic modesty as if it eliminated all uses of teleology in physics. But this is overly hasty, and does not address the appeal to natural, bodily purposes in *local* cases used by Aristotelian physics. To do so requires putting the Sixth Meditation introduction of functional explanation at the service of alternative, teleology-free forms of comprehensive explanation.
- 3 This is because the ontology of extension alone may lack sufficient resources for identifying and individuating our bodies. This seems Descartes's reason for declaring to Mesland that "the numerical identity of the body of a man does not depend on its matter, but on its form, which is the soul" (3:279; AT 4:346; see also 3:197; AT 3:434 and 3:208; AT 3:505). On this view, both senses of "nature" truly belong to our bodies, because our bodies are ontologically mixed: their constitution is one thing; their identity, another. See Garber (1992: ch. 4); Des Chene (2001).
- 4 Descartes's discussion focuses on restricted species of attraction and aversion, e.g., *agrément* and *horreur*, which we experience when an object is "represented to the soul by the external senses" (1:358; AT 11:392). CSM translates these terms as "attraction" and "repulsion," reserving "aversion" for a desire involving *horreur*. Here I use "attraction" and "aversion" generally to indicate directions of motivation.
- 5 My discussion has benefited from conversations with Deborah Brown, Lisa Shapiro, and Aladdin Yaqûb, who encouraged my tentative forays into functional explanation in Descartes. I'd also like to thank John Carriero for very helpful suggestions, and the audience for a session at the Canadian Philosophical Association Congress in May 2006, particularly Jack MacIntosh and Mark Migotti.

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Chapter 26

Descartes's Ethics

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Descartes is not widely recognized for his ethical thought. Indeed, some might be surprised to learn that Descartes had *any* thoughts at all about moral philosophy. While Descartes's writings do not include any systematic and definitive presentation of this area of philosophy, his writings *are* permeated with a concern for the conduct of life, and they do include some developed pieces that can guide us as we try to figure out just in what Descartes's moral philosophy consists. In this chapter, I draw on both these elements of Descartes's writings to show he is best understood as a kind of virtue ethicist. A virtue ethics takes the good to consist in virtue; virtue consists in a disposition to act in the right ways for the right reasons in any given set of circumstances. By contrast, a deontological ethics takes the good to consist in a set of rules or duties; a eudaimonist ethics holds that the good is just happiness; and a consequentialist ethics holds that the good consists in performing actions with the best outcomes.

I begin my discussion by considering how to relate Descartes's more general concern with the conduct of life to the metaphysics and epistemology in the foreground of his philosophical project. I then turn to the texts in which Descartes offers his developed ethical thought and present the case for Descartes as a virtue ethicist. My argument emerges from seeing that Descartes's conception of virtue and the good owes much to Stoic ethics, a school of thought which saw a significant revival in the seventeenth century. It does, however, deviate from classical Stoicism in critical ways. Towards the end of my discussion, I return to the question of the relation between Descartes's ethics and his metaphysics and epistemology, and I suggest that the *Discourse on the Method for Rightly Conducting Reason* and the *Meditations on First Philosophy* are invested with the virtue ethical considerations of moral education and the regulation of the passions, respectively.

Cartesian Philosophy and the Conduct of Life

Though several scholars have remarked upon the ethical dimension of Descartes's work in recent years, it is fair to say that Descartes is widely viewed as principally a metaphysician and epistemologist, and it is for his contribution to these areas of philosophy that Descartes holds the place he does in the history of philosophy. We turn to

Descartes to see the development of a substance-mode ontology, and the canonical form of dualism; to see perhaps the first modern well-worked out view of the natural world divested of all but efficient causes; and to see an account of knowledge and certainty which aims to answer the skeptic by showing that there are some claims which are immune to doubt (perhaps because the skeptic himself must rely on them) and on which the rest of our knowledge can be founded. Both historians of philosophy, who are interested in working through the details of these positions, and contemporary philosophers, who find it useful to advert to “Cartesian” positions (usually as a foil) to articulate their own views, tend to treat the central tenets of Cartesian metaphysics and epistemology abstracted from the rest of Descartes’s philosophy. However, more often than not, within Descartes’s writings these issues are not treated in abstraction from a question of how to lead one’s life. The issue is how to understand the relation between Descartes’s concern with this question and his metaphysics and epistemology.

In the Preface to the French edition of the *Principles of Philosophy*, Descartes explicitly frames his attention to questions in metaphysics, epistemology, and natural philosophy with a concern for improving the conduct of life:

The word ‘philosophy’ means the study of wisdom, by ‘wisdom’ is meant not only prudence in our everyday affairs but also a perfect knowledge of things that mankind is capable of knowing, both for the conduct of life, and for the preservation of health and the discovery of all manner of skills. But in order for this knowledge to be perfect it must be deduced from first causes; thus, in order to set about acquiring it – and it is this activity to which the term ‘to philosophize’ strictly refers – we must start with the search for first causes or principles. (1:179; AT 9B:2)

While metaphysics and epistemology might well be the subject of philosophy properly speaking, the search for first principles serves the practical end of achieving wisdom, which Descartes here clearly thinks of as practical rather than theoretical. This attention to the practical import of first philosophy is present from very early on in his writings. In the first rule adumbrated in the *Rules for the Direction of the Mind*, Descartes advises those who “seriously want to investigate the truth of things” to “consider simply how to increase the natural light of his reason . . . in order that his intellect should show his will what decision it ought to make in each of life’s contingencies” (1:10; AT 10:361). In the *Discourse on the Method*, Descartes recounts that his purpose in pursuing philosophy was “to learn to distinguish the true from the false in order to see clearly into my own actions and proceed with confidence in this life” (1:115; AT 6:10). Indeed, Descartes begins the *Optics* – one of the three essays accompanying the *Discourse* and a work principally about the properties and behavior of light – by defending its importance for the conduct of life (see 1:152; AT 6:81). A similar point is made in the public letter to Voetius of May 1643, where Descartes defends his philosophical program against Voetius’s attacks by asserting the benefits of his way of doing philosophy for life (3:220–1; AT 8B:26).

It is hard to know what Descartes intends in subordinating his philosophical interests to a larger concern with the conduct of life. He might simply be adverting to the pragmatics of daily life, hoping that his philosophical insights would pave the way for technologies that would make the tasks of daily life less of a chore. There need be

nothing ethical about this sort of concern. If we focus on Descartes's medical writings, and those involving what we would term the applied sciences, it is reasonable to take Descartes as simply wanting to make life easier, without attention to whether that life is led well or badly. In addition, some remarks Descartes makes in the context of the *Meditations* seem to support this sort of reading. There, Descartes suggests that practical philosophy is distinct from first philosophy. This could easily imply that the conduct of life is distinct from the pursuit of truth. (See, for instance, the Synopsis of the Fourth Meditation (2:11; AT 7:15), the Replies to the Second Objections (2:106; AT 7:149), and the Reply to the Fourth Objections (2:172; AT 7:248). See also the replies to Gassendi (2:243; AT 7:351) and to Bourdin (2:320; AT 7:475).)

However, a remark Descartes makes in the Preface to the French edition of the *Principles of Philosophy* suggests another way of thinking about the relation between his concern with the conduct of life and his metaphysics and epistemology. There he writes:

The whole of philosophy is like a tree. The roots are metaphysics, the trunk is physics, and the branches emerging from the trunk are all the other sciences, which may be reduced to three principal ones, namely medicine, mechanics and morals. By 'morals' I understand the highest and most perfect moral system which presupposes a complete knowledge of the other sciences and is the ultimate level of wisdom. (1:186; AT 9B:14)

The metaphor of the tree of philosophy outlines a relation between moral philosophy and the rest of philosophy whereby ethics grows out of the trunk of physics and is rooted in metaphysics. It is not merely grafted on to a fully developed tree. If we take the concern with the conduct of life as equivalent to an ethical concern with the question of how one should live, we can understand the metaphor along the following lines. To improve the conduct of life, or to best answer the question of how one should live, we need to understand ourselves and the world we live in, that is, we need scientific knowledge or physics. And we require a proper metaphysics to arrive at scientific knowledge. In this way, then, the study of metaphysics and epistemology is motivated by the overarching ethical concern, just as much as metaphysics informs our ethics. Ethics and metaphysics and epistemology, on this view, are tightly knit.

Thus, in thinking about Descartes's remarks about the conduct of life, we are faced with a question. Is his concern with the conduct of life merely pragmatic and so not essentially related to his metaphysics and epistemology? Or is his concern with the conduct of life ethical and so essentially related to his metaphysics and epistemology? In what follows I make the case that Descartes's ethics and his metaphysics are tightly knit. In light of this, I am strongly inclined to take Descartes's concern with the conduct of life as ethical, but my argument for this is indirect.

There are two additional elements to draw attention to here, both associated with the metaphor of the tree of philosophy. I will explore each in greater detail in my discussion of Descartes's developed ethics. First, note that Descartes introduces the idea of a "perfect moral system" in his metaphor. I will return to this idea after a brief initial presentation of the key texts for understanding Descartes's ethics. Second, note that the position of "morals" or ethics on the tree is equivocal. On the one hand, "morals" is presented as a branch on a par with the other two. On the other hand, it is singled out

as the only branch providing “the ultimate level of wisdom.” In discussing the Cartesian notion of generosity, I will make some sense of this equivocation.

Putting the Pieces of Descartes’s Ethical Writings Together: Cartesian Virtue Ethics

My focus now turns to Descartes’s developed ethical writings, found in the *Discourse on the Method*, correspondence with Princess Elizabeth, and the *Passions of the Soul*. After briefly presenting the texts, I consider how to make sense of the relation between the “perfect moral system” we just saw alluded to in the Preface to the *Principles* and the *morale par provision* we will soon see Descartes presents in the *Discourse on the Method*. (*Morale par provision* is usually translated as “provisional moral code.” So as to not prejudice interpretive issues, I leave the French untranslated.) I move on to make the case that Descartes was a virtue ethicist and to clarify his particular brand of virtue ethics. Lastly, I return to consider how we can connect Descartes’s developed ethics with his general concern with the “conduct of life” by examining how moral education and the regulation of the passions figure in the *Discourse* and the *Meditations*, respectively.

Key Texts

There are three places where we find some developed ethical thought in Descartes’s writings. First, in Part Three of the *Discourse*, first published in 1637, Descartes puts forward what he terms a *morale par provision*, “consisting of just three or four maxims” (1:122; AT 6:22). The first maxim is “to obey the laws and customs of my country, holding constantly to the religion in which by God’s grace I had been instructed from my childhood, and governing myself in all other matters according to the most moderate and least extreme opinions – the opinions commonly accepted in practice by the most sensible of those with whom I should have to live” (1:122; AT 6:23). The second maxim is “to be as firm and decisive in my actions as I could, and to follow even the most doubtful opinions, once I had adopted them, with no less constancy than if they had been quite certain” (1:123; AT 6:24). The third maxim is “to try always to master myself rather than fortune, and change my desires rather than the order of the world” (1:123; AT 6:25). And the fourth maxim is to choose as his life’s occupation “to devote my whole life to cultivating my reason and advancing as far as I could in the knowledge of the truth, following the method I had prescribed for myself” (1:124; AT 6:27). Two general interpretive issues arise from this *morale*. First, we need to understand this expression *par provision*, or in what sense the moral code is provisional. Second, of course, we need to better understand the ethics put forward in these maxims. The discussion below addresses both these issues.

Second, Descartes’s correspondence with Princess Elizabeth of Bohemia of 1645–7 incorporates a discussion of moral philosophy.¹ Of particular interest is the correspondence of 1645, which begins from a consideration of the regulation of the passions, but, motivated by a reading of Seneca’s *De Vita Beata*, moves quickly to the question of

the supreme good (Descartes sometimes also terms it “the sovereign good”), and includes a discussion of the nature of virtue along with its relation to happiness. In his brief exchange with Queen Christina of Sweden in 1647, Descartes distills some of this earlier exchange with Elizabeth, and offers a summary of his views on the supreme good. In the discussion below, I will focus on the account of Cartesian virtue to explicate what sort of virtue ethics Descartes espouses.

Finally, in his last work, *The Passions of the Soul*, published in 1649, Descartes punctuates his systematic natural philosophical treatment of the passions with a continuation of his discussion of virtue. In this work we also find a more detailed account of the regulation of the passions. Most importantly, the notion of generosity, first fully explicated in this work, offers important insight into Cartesian ethics. For Descartes, generosity is both a passion and a virtue, and indeed is “the key to all the other virtues and a general remedy for all the disorders of the passions” (Descartes 1989: 109; AT 11:454). For him, “generosity” refers to an understanding that one has a free will and a resolve to use that will well; the liberality of giving we associate with the term is an effect of generosity. Understanding Cartesian ethics involves understanding this peculiar sense of “generosity,” its role in regulating the passions, and how it is “the key to all the other virtues.”

The “Perfect Moral System” and the *Morale Par Provision*

Recall that in his metaphor of the tree of philosophy Descartes introduces an idea of a “perfect moral system.” I want to begin to bring the different elements of Descartes’s developed ethics together by considering just what he means by a perfect moral system and how to understand the *morale par provision* in relation to it. Standard readings take the *Discourse’s morale* to be provisional in the sense of temporary – a stop *en route* to the true morality. Attending to the Stoic influences on Descartes’s ethics affords us a very different way of understanding these maxims. I suggest that we read the maxims as akin to Stoic unconditional obligations. As such they comprise in part a perfect moral system; they provide the frame, or set of constraints, for the other part of that perfect moral system, a set of rules governing particular actions, akin to Stoic circumstantial obligations. Understood in this way, we can see the maxims as provisional in a juridical sense.

Recent commentators on Descartes’s ethics have assumed that for him a moral system must be constituted by a set of rules regulating daily life. That is, they assume that Descartes’s ethics is a species of a deontological ethical theory, defining the good as a set of rules we have a duty to follow. On this view, the more perfect the moral system, the more actions the rules constituting the system govern. A perfect moral system would thus provide a complete set of rules, governing all our actions. This assumption, along with a focus on Descartes’s skeptical method, sets up two competing understandings of the *morale par provision* of the *Discourse*. On the first reading, the set of moral maxims that Descartes offers there is taken to be a stop-gap measure to carry one through a period of skeptical doubt. Though the search for truth is meant to be removed from the practical context (2:15; AT 7:22), one will still have to cope with the basics of daily life while engaged in it. These maxims are, on this view, meant to ensure

that the philosophically minded do not land themselves in too much trouble in the course of their efforts to discover the first principles. The *morale* is meant to be provisional because there is no good reason to think that the maxims will be retained once the skeptic is answered and first principles are firmly established. The *Discourse's morale* thus does not constitute a moral theory, but rather consists in a set of pragmatic measures undertaken in service of first philosophy. On the second reading, the *morale par provision* does have pragmatic value, but it is far from merely pragmatic. Rather, it consists in a basic, if revisable, set of rules meant to guide right action, and so constitutes a proper moral theory, if but a fledgling one. On this view, the *morale* of the *Discourse* is taken as provisional insofar as the maxims there laid out are a first approximation of what will be, once the skeptic has been fully answered at some undefined point in the future, the perfect moral system. (See Marshall 1998 for an exemplary version of this interpretation.)

There is also a third possibility for understanding the sense in which the *morale* of the *Discourse* is *par provision*. Michèle LeDoeuff has suggested that both English-language and French commentators have misunderstood the expression *par provision*. Rather than meaning “provisional” in the sense of “temporary,” *par provision* “is a juridical term meaning ‘what a judgment awards in advance to a party’ . . . The provision is not liable to be put in question by the final judgment” (LeDoeuff 1989: 62). There is good reason to prefer this third reading of *par provision*.

To see this, let us first consider the Stoic influences in Descartes's ethics. While the standard readings of the *morale par provision* are certainly right in seeing the influence of ancient skepticism on Descartes's philosophy, there are a number of reasons to look to other influences, and in particular that of Stoicism. First, the standard readings also assume Descartes is a deontological ethicist, and this view would seem to undermine a reading of Descartes as a virtue ethicist. An ethics focused on virtue, after all, is one that focuses dispositions to do the right thing for the right reasons, and acting well in this way is not understood simply as adhering to a set of rules. However, a virtue ethics need not be incompatible with a set of rules governing actions. Stoic ethics was both a virtue ethics and one concerned to lay out a comprehensive set of rules for action, and so might help us in reconciling different aspects of Cartesian ethics. Indeed, the maxims in the *Discourse* seem more interested in virtues like resoluteness and self-mastery than in setting out rules for action.

Second, the historical context in which Descartes was writing gives us good reason to believe that he was influenced by Stoic writings. The seventeenth century saw a revival of Stoic philosophy owing largely to the recovery of Stoic texts and the work of Justus Lipsius in laying out Stoic philosophy from its physics to its ethics. While to date little work has been done in tracing the influence of Stoic physics on philosophers and scientists of the early modern period, more has been done in bringing to light the influence of the revival of Stoicism on early modern ethical theories. (See Levi 1964; Rutherford 2004.) The revival of Stoic ethics and political thought impacted the work of Hugo Grotius, in *The Laws of War and Peace*, and Stoic ethics was popularized in France through the works of moralists such as Pierre Charron and Guillaume DuVair (Charron was also influenced by the revival of skepticism). There is good reason to read Descartes as figuring in this Stoic revival. There are clear echoes of Stoic thought in the

maxims Descartes offers us in the *Discourse*. The Stoic sage was characterized by his success at self-mastery, that is, aligning his desires with the order of nature, and this is precisely what the third maxim of the *morale* demands. Equally, just as the second maxim calls for resoluteness in action, so too must the Stoic sage be guided solely by his proper understanding and not turned by external influences. The affinity between Descartes's maxims and Stoic ethics certainly suggests a line of influence. Equally, Descartes's selection of Seneca to read with Princess Elizabeth is evidence of an interest in Stoic thought, and his commentary shows him to be drawing on and appropriating Seneca's Stoic ethics to his own ends (Rutherford 2004 works through some of the details). Looking more closely at Stoic ethics might well help us to better understand Descartes's *morale par provision* and its relation to his notion of a perfect moral system.

Some strands of Stoicism worked towards articulating a complete set of *kathêkonta*, translated as "duties" or "obligations" but also as "proper functions" and "befitting actions," which aimed to set out just how the sage would act in every imaginable situation. That is, the *kathêkonta* were meant to be an extensive array of rules governing every action of daily life. Within this set of rules, some were conceived as general or "unconditional obligations"; they were rules a sage would adhere to in his actions in all circumstances. They included, for example, prescriptions to tend to one's health and one's sense organs. Insofar as these rules are to guide us unconditionally, they set out constraints on all our other decisions, and so frame the way we are to live our lives. The Stoics also set out highly particular rules, or "circumstantial obligations." These rules set out how the virtuous person, or sage, would act in very specific circumstances. They might, for instance, demand that we give away all our possessions if we find ourselves to be one of the very few with possessions among many without any.

From the vantage point of the intellectual historical context, it is natural to read the maxims of the *morale par provision* as a set of unconditional duties. For one, as we have already seen, the content of several of these maxims bears a striking affinity to some basic principles of Stoic ethics. Moreover, a closer look at the maxims of the *morale par provision* shows them to be framed as general rules, applicable in all circumstances. Being firm and decisive in one's actions, aiming to master oneself rather than fortune, and cultivating one's reason are clearly not principles of conduct tailored to a particular set of circumstances. And while it might seem that following local customs and abiding by the least extreme opinions is circumstance-specific, the maxim is presented as a general rule to apply no matter by which customs and opinions one finds oneself surrounded. The first maxim is simply meant to provide us with a secure starting point from which to follow the method of reasoning that will lead us to knowledge. All four maxims thus serve as overarching principles that guide one's approach to one's life; they serve to frame the context in which one will make particular decisions. In this way they are themselves not dependent on the conditions in which those particular decisions will be made. They are similar both in kind and in function to Stoic unconditional duties.

Following this line, we are afforded further insight into what Descartes intends in invoking a "perfect moral system." Just as the complete Stoic moral system includes both unconditional and circumstantial duties, insofar as Descartes's ethics is influenced

by Stoic ethics, we should expect Descartes's perfect moral system to include not only a set of unconditional duties which frame our general approach to life, but also a complete set of rules governing the particular decisions we make in the course of life, that is, a complete set of circumstantial duties. Thus, the Cartesian perfect moral system would include not only the maxims of the *morale par provision* but also rules for action we would arrive at were we to have a comprehensive understanding of the world – that is, a complete physics.

If I am correct about how to understand the *morale par provision* and the Cartesian perfect moral system, we can see that the standard approaches miss the mark. The maxims of the *morale* are not to be understood as pragmatic stop-gap measures put in place until we arrive at the true and perfect moral system. Nor are they to be understood as approximations for the rules for action arrived at with perfect knowledge. With perfect knowledge, we will arrive at new rules for action, but these rules are not meant to supersede the maxims of the *morale*. Rather, the *morale* provides us with the unconditional duties that frame our approach to the conduct of life. Once we have complete knowledge we will be able to supplement those general rules with a set of particular rules meant to govern our actions in all the circumstances of life. This set of circumstantial duties does not preclude but rather presupposes the validity of the unconditional duties.

While the interpretation sits well in a number of ways, a question still looms: Why is the *morale* of the *Discourse* a *morale par provision*? If the maxims are meant to be a set of unconditional duties, in what sense are they *par provision*?

It is useful to note that Descartes does not at all seem to take the maxims of the *Discourse* as provisional in the same way the standard readings do. Tracing the trail of the second maxim through Descartes's writings drives home this point. At the same time it will help prepare us for considering Cartesian virtue. Recall that the second maxim is “to be as firm and decisive in my actions as I could, and to follow even the most doubtful opinions, once I had adopted them, with no less constancy than if they had been quite certain.” This same principle emerges early on in Descartes's correspondence of 1645 with Princess Elizabeth, where we find his most developed ethical thought. There, in commenting on what he thinks Seneca ought to have said in his *De Vita Beata*, Descartes sets out explicitly just in what he takes virtue to consist: “a firm and constant resolution to carry out whatever reason recommends” (letter to Elizabeth, August 4, 1645, AT 4:265). The similarity between this definition of virtue and the second maxim is evident, and Descartes himself appeals to the *Discourse* in setting out this account to Elizabeth.

It is also clear that Descartes is firmly committed to this account of virtue. He reiterates this point numerous times in correspondence with Elizabeth. In his letter to her of August 18, 1645 he writes: “In order to achieve a contentment which is solid, we need to pursue virtue – that is to say, to maintain a firm and constant will to bring about everything we judge to be the best, and to use all the power of the intellect in judging well” (3:262; AT 4:277). And the same point is made in his letter to Elizabeth of September 1, 1645: “We can never practice any virtue – that is to say, do what our reason says we should do – without receiving satisfaction and pleasure from doing so” (3:263; AT 4:284). Descartes also makes the same claim about the nature of virtue to Queen Christina in his letter of November 20, 1647:

I do not see that it is possible to dispose it [the will] better than by a firm and constant resolution to carry out to the letter all the things which one judges to be the best, and to employ all the power of one's mind in finding out what these are. This by itself constitutes all the virtues; this alone, finally, produces the greatest and most solid contentment in life. So I concluded that it is this which constitutes the supreme good. (3:325; AT 5:83)

Moreover, this same account of virtue is carried forward into the *Passions*, where in article 148 he writes:

For anyone who has lived in such a way that his conscience cannot reproach him for ever having failed to do anything he judged to be the best (which is what I call following virtue here) derives a satisfaction with such power to make him happy that the most vigorous assaults of the passions never have enough power to disturb the tranquility of his soul. (Descartes 1989: 101; AT 11:442)

It is also contained in the definition of generosity, as we shall see below. (See also *Passions*, article 144; Descartes 1989: 97; AT 11:437.) Descartes's clear commitment to this second maxim argues against the view that the *morale* maxims are merely provisional. It is worth noting that Descartes also reaffirms the first and third maxims of the *morale* in correspondence with Elizabeth, as well as in the *Passions of the Soul*, further arguing against the standard readings. (See 3:257ff.; AT 4: 265ff.; 3:263ff.; AT 4:284ff.; 3:267; AT 4 294ff.; as well as *Passions* articles 144–6; Descartes 1989: 97–100; AT 11:436ff.)

By contrast, the account I have been developing of the relation between the perfect moral system and the *morale* by drawing on Stoic ethics fits very well with the juridical sense of *par provision* suggested by LeDoeuff. Legal provisions, recall, are not to be called into question in the final judgment, and indeed constrain and so frame the judgment. I have suggested that we think of the *morale*'s maxims as a set of unconditional duties. The maxims, as unconditional duties, are not to be called into question as we arrive at the perfect moral system, and indeed they frame the circumstantial duties we will arrive at with complete knowledge. That is, the Cartesian perfect moral system will consist in a comprehensive guide for action that includes all circumstantial duties as well as the framing unconditional duties or maxims.

Cartesian Virtue

I have been arguing that at the center of Descartes's ethics is a set of rules, some unconditional and some circumstantial. However, I have also been maintaining that Descartes is a virtue ethicist. Though it might seem that these claims are incompatible with one another, there are, as I noted earlier, virtue ethics which are also concerned with articulating a set of rules for action: Stoic ethics is such a virtue ethics. The difference between the two ethics lies in their conception of the good. On a deontological moral theory, the good consists in adherence to the rules constituting the ethical system and act badly insofar as we fail to do so. A virtue ethics holds that the good consists in virtue, where virtue is not identical to adhering to a set of rules. Tracing the trail of the second

maxim has shown that Descartes holds that virtue is our supreme good. This commitment marks Descartes as a virtue ethicist. In this section I examine Descartes's account of virtue as our supreme good in more detail. After providing further evidence that Descartes does take virtue to be our supreme good, I examine a peculiarity of his account of virtue as resolving to act in accord with our best judgments. Our best judgments can still be wrong, after all, and so Descartes needs to distinguish better from worse moral judgments. I show how a proper metaphysics, along with his notion of generosity, addresses this issue.

In the early part of his 1645 correspondence with Elizabeth, Descartes is not completely clear that virtue is our supreme good. In his remarks on Seneca that begin the discussion, he focuses on the contentment of mind that constitutes true happiness (*béatitude*). While he does not go so far as to assert that this true happiness is the supreme good, he is principally concerned to articulate the causes of this happiness and how we might achieve it. Insofar as this true happiness is conceived as the end toward which we should be striving, it can certainly seem as if Descartes thinks that our good consists in this contentment, and so has a eudaimonist ethics. In his next letter, of August 18, 1645, Descartes sets out to clarify his position, distinguishing between happiness, the supreme good, and the end or goal of our actions. Here he is quite clear:

I note, first, that there is a difference between true happiness, the sovereign good and the final end or goal to which our actions ought to tend. True happiness is not the sovereign good; but it presupposes it, and it is the contentment or satisfaction of the mind that comes from possessing it. But, by the end of our actions, we can understand either the one or the other. For the sovereign good is without doubt the thing which we ought to put forward to ourselves as the goal of all our actions, and the contentment of mind that comes from it is also rightly called our end, as it is what attracts us and so makes us seek the sovereign good. (AT 4:275)

In the end, for Descartes, happiness or contentment is not itself our supreme good. He thus does not espouse a eudaimonist ethics. Rather, we achieve happiness as a consequence of our achieving the good. In our actions, we ought to strive towards our supreme good rather than happiness. However, insofar as our achieving that good is both necessary and sufficient for achieving happiness, we can also think of ourselves as aiming for happiness in our actions. Descartes illustrates this point through an analogy with an archery competition:

But just as when there is a prize for hitting a bull's eye, one makes people want to hit the bull's eye by showing them this prize, still they cannot win the prize if they do not see the bull's eye. And those who see the bull's eye cannot for that reason be induced to aim for it, if they do not know that there is a prize to win. In this way, virtue, which is the bull's eye, does not come to be strongly desired when it is seen on its own; contentment, which is the prize, cannot be acquired, unless it is pursued. (AT 4:277)

Even if an archer entered a competition to win the prize, this motivation alone would not lead him to success. In order to win the prize, he must actually shoot well and hit the bull's eye. Yet a good archer might not be motivated by his talent alone to enter

the competition; a prize might motivate him to enter it. In a similar way, aiming for happiness will not guarantee we act well and achieve virtue; yet knowing how we should act might not always motivate us to action. The happiness that comes from acting well can provide motivation. For Descartes, our supreme good consists in virtue and only virtue, and our achieving this supreme good cannot but make us truly happy. In our actions, we ought to aim for virtue, and we are motivated to do so because of the happiness that results.

Descartes's virtue ethics is somewhat peculiar. It is striking that, for him, virtue does not require that our best judgments be correct ones. On Descartes's account, virtue consists in resolutely acting in accord with what we judge to be the best. But of course our best judgments can be mistaken. For instance, we often act in ways we judge to be beneficial to a person, perhaps even to ourselves, when in fact those actions are not in his, or our, interest and are harmful. Descartes is clear that we can still be virtuous even in these cases. He writes, "it seems to me . . . that one has no reason at all to repent when one has done what one judges to be the best at the time that one had to be resolved to act, even if, afterwards, in rethinking the matter with more leisure, one judges that one was wrong" (to Elizabeth, October 6, 1645; AT 4:307). Indeed, he continues, "we are responsible only for our thoughts, and human nature is such that we do not know everything nor always judge so well off the cuff as when we have a lot of time to deliberate" (*ibid.*). Elizabeth had expressed concern that Descartes's account of virtue was psychologically implausible. When we misjudged the best course of action, she objected, the falsity of the judgment would undermine our resolve to follow our best judgments in the future. It would thus undermine our virtue and compromise our contentment. Descartes's account of virtue, she claimed, demands "an infinite science" so that we would never err in judging the best course of action (see letter of Elizabeth to Descartes, September 13, 1645; AT 4:289). Descartes's reply here reflects his view that even when we do misjudge things, we can remain both virtuous and content. We need only remain confident that our judgments were the best we could have made under the circumstances. This confidence affirms our resolve, prevents us from feeling remorse, and allows us to rest content and be truly happy.

Descartes's account of virtue both resonates with and diverges from an aspect of an Aristotelian account of virtue. Aristotle distinguishes the virtuous person from the continent one. Both individuals perform good actions. The continent person acts well by happenstance, and not from an understanding of the good. The virtuous person, on the other hand, acts well for the right reasons, that is, from an understanding of the good. For Descartes, too, virtuous action requires acting from an understanding of the good. We are virtuous, for him, because we have aimed to judge well and to act in accordance with that judgment.² However, Descartes's account of virtue differs from Aristotle's in an important respect. On the Aristotelian account, virtue requires the world cooperate with our intentions. We fail to achieve virtue fully if our actions do not succeed in their aim. If we mean well, but do harm, we have morally failed. For Descartes, as we have seen, good intentions are sufficient for virtue.

Descartes's account also differs importantly from Stoic accounts of virtue in this regard. As noted above, Stoic ethics is a virtue ethics. Stoic *kathēkonta*, both unconditional and conditional obligations, are grounded in facts about human nature and are meant to articulate not only the implications of virtue, but also the details of just what

is required to achieve the Stoic ideal of “living in agreement with nature.” Virtue or living in agreement with nature is a matter of having a proper understanding of the world. Furthermore, on the Stoic line, virtue is an all-or-nothing affair. One either lives wholly in agreement with nature, or one is vicious. There are no degrees of virtue. Thus, to be virtuous, all one’s judgments must be true, and one must have a complete understanding of the world. While Descartes’s account of virtue clearly draws on the Stoic account, his account of virtue is much less demanding. For him, to be virtuous does not require true judgments; it does require that we strive to judge well and to act on our best judgments. Elizabeth’s objection noted above might well be read as pushing Descartes towards a more consistent neo-Stoicism. (Her objections in later letters, however, reflect a skepticism regarding our knowledge of the true value of things, and ultimately a rejection of a demanding Stoicism. See Elizabeth to Descartes, September 30, 1645; AT 4:303.)

Because Descartes’s virtue does not require true judgments, his virtuous person can seem somewhat given to smug self-satisfaction, always confident he has judged the best he could, even if he turns out to have been wrong. In the *Passions*, however, Descartes warns against an unvirtuous self-satisfaction, full of “pride and impertinent arrogance,” while allowing for a virtuous self-satisfaction that leads to the “tranquility and repose of conscience” proper to true happiness (*Passions* a.190; Descartes 1989: 121–2; AT 11:471–2). What distinguishes virtuous self-esteem from unvirtuous self-satisfaction is simply whether an agent’s judgments really were the best she could have made. But how are we to distinguish better from worse judgments if not on the basis of their truth or falsity?

Descartes does not lay out a set of criteria whereby we can rank judgments or test to make sure we are judging the best we can. However, his remarks suggest that what is important is our method in making judgments. Descartes writes to Elizabeth that the right use of reason prevents virtue from being false, and it does so in that, “by making us recognize the condition of our nature, it sets bounds to our desires” (to Elizabeth, August 4, 1645; AT 4:267). The right use of reason certainly includes “knowledge of the truth.” However, “because nobody except God knows everything perfectly, we have to content ourselves with knowing the truths most useful to us” (to Elizabeth, September 15, 1645; AT 4:291).

The truths Descartes enumerates as “most useful” in the letter of September 15, 1645 are just the set of basic principles of his metaphysics:

Among these [truths most useful to know], the first and the principal one is that there is a God on whom all things depend, whose perfections are infinite, whose power is immense, and whose decrees are infallible. . . . The second thing it is necessary to know is the nature of our mind, insofar as it subsists without the body and is much more noble than it and capable of enjoying an infinite number of contentments which are not found at all in this life. . . . In this regard, what can also serve greatly is to judge in a dignified way the works of God, and to have an idea of the vast extent of the universe, as I have tried to present in the third book of my *Principles*. (AT 4:291–2)

This list helps us in better understanding the place of morals in the metaphor of the tree of philosophy from the Preface to the *Principles*. If by “morals” we are to understand

virtue – to be resolved to act in accordance with our best judgments – we need to grasp the roots of philosophy, the existence of God, the natures and real distinction of mind and body, but we also need to understand something of physics in order to appreciate the vastness of the universe and so be able to understand our proper place in it. However, for Descartes, we need to understand ourselves not only with respect to the physical world but also with respect to other persons, whose interests might well be different from our own, but upon whom we also depend. Our moral judgments, for him, turn upon our understanding of our proper place in the world, our relations to other things and agents. As Descartes writes in that same letter to Elizabeth:

even though each of us is a person separate from others and, by consequence, with interests that are in some manner distinct from those of the rest of the world, one must, all the same, think that one does not know how to subsist alone and that one is, in effect, one part of the universe and, more particularly even, one part of this earth, one part of this state, and this society, and this family, to which one is joined by his home, by his oath, by his birth. (AT 4:293)

We cannot “discern the best course in all actions of life” (AT 4:291) without understanding our place in a social and natural whole, and our moral judgments will be better or worse in proportion to our understanding of the relations we stand in.

While having the correct metaphysics might well be essential for correct moral judgment, it cannot be sufficient for determining whether a given moral judgment is better or worse. For while we might be able to attain certainty about metaphysical matters, we are by our very nature as finite beings unable to attain certainty about the infinite natural world and so of our place in it, let alone of our place in the social world. Elizabeth raises similar concerns in her letters to Descartes of September 30, 1645 (AT 4:303) and October 28, 1645 (AT 4:324). According to Descartes, given this natural handicap, to regulate our conduct we should strive to distinguish those things that depend only on us from those which do not depend on us. As Descartes writes in article 144 of the *Passions of the Soul*, “the error most commonly committed in connection with desires is to fail to distinguish sufficiently the things that depend entirely on us from those that do not depend on us” (Descartes 1989: 97; AT 11:436). In most cases, however, things depend on us but in part. Here, “because most of our desires extend to things which do not depend entirely on us or entirely on others, we should distinguish carefully within [those things] that which depends only on us, in order to limit our desire to that alone” (*Passions* a.146; Descartes 1989: 99; AT 11:439). That is, for Descartes, the measure that is to guide our relations to things, under conditions of imperfect knowledge, is that of the degree to which things depend on us, or are in our power. (We can read Descartes, in his discussion here, as fleshing out the third maxim of the *morale* in the *Discourse*.)

This aspect of Cartesian virtue provides a method for regulating the passions insofar as the passions dispose us to action. In reasoning about what we should do in situations where we have incomplete knowledge – that is, in all situations – a virtuous person aims to understand her proper place in the scheme of things; she also aims to distinguish what depends on her from what does not. Drawing this distinction properly, for Descartes, results in her ceasing to desire those things that she has no power to bring about. In regulating these “vain desires” the virtuous person effectively regulates her

passions: she does not hope for what she herself cannot help bring about; she does not fear approaching danger, as she is assured she will do all that she is able to do to avoid it and has accepted what she cannot control; and she does not regret her past actions for she cannot bring back the past, she is satisfied she did what she thought best, and she learns from her mistakes. In this way, she finds herself content or truly happy. Obviously, getting one's desires and one's passions in order in this way is no easy task. It is the rare person who is able to quell his fears and avoid regretting actions that, though well-intentioned, did not turn out as planned. Nonetheless, for Descartes, we are all virtuous insofar as we approach this ideal, that is, insofar as we strive to distinguish what depends on us from what does not.

The key to Cartesian virtue then is having a proper sense of what depends on us. This sense serves as the measure of our relation to other things and so of our place in the world. Descartes does recognize that this sense can be distorted just as much as it can be true. We have already seen this a bit in his treatment of self-satisfaction. What Descartes terms "generosity" is by its very definition proper self-esteem, and so constitutes the proper sense of self that affords us a true sense of what depends on us. For Descartes,

true generosity, which makes a man esteem himself as highly as he can legitimately esteem himself, consists only in this: partly in his understanding that there is nothing which truly belongs to him but the free control of his volitions, and no reason why he ought to be praised or blamed except that he uses it well or badly; and partly in his feeling within himself a firm and constant resolution to use it well, that is, never to lack the volition to undertake and execute all the things he judges to be best – which is to follow virtue perfectly. (*Passions* a.153; Descartes 1989: 104; AT 11:445–6)

Within this definition of generosity, the pieces of Descartes's account of virtue come together. Cartesian virtue consists in a resolution to act in accord with our best judgments. While even our best judgments might be mistaken, we judge well insofar as we have the proper metaphysics and distinguish properly what depends on us from what does not. For Descartes, what properly depends only on us is just our free will. In order to be virtuous, then, we must understand this fact about our nature. Doing so allows us to distinguish what depends on us from what does not, and so allows us to understand our proper place in the world. This understanding in turn informs our practical judgments and allows us to use our will well. Moreover, this understanding of ourselves as freely willing moves us to use our will on itself – that is, to resolve to use our free will well. As we have seen, this resolve is the defining feature of Cartesian virtue. It should not be surprising then that Descartes deems generosity "the key to all the virtues" (*ibid.*). (For a detailed discussion of generosity, see Shapiro 1999.)

There are two additional elements of Descartes's account of generosity worth noting, for they help to complete this account of Descartes as a virtue ethicist. First, generosity is associated with a set of attitudes and character traits. A generous person is "easily convinced" that other people too understand they have a free will and are resolved to use their will well, and so she treats others with respect and does not scorn them (*Passions* a.154; Descartes 1989: 104; AT 11:446–7). This respectfulness accompanies a "virtuous humility" that "causes us not to prefer ourselves to anyone" (*Passions* a.155; Descartes 1989: 105; AT 11:447). Equally, "[t]hose who are generous are naturally

inclined to do great things, and yet to undertake nothing they do not feel themselves capable of . . . [T]hey are always perfectly courteous, affable and of service to everyone" and "entirely masters of their passions" (*Passions* a.156; Descartes 1989: 105; AT 11:447–8). Generosity is thus "the key to all the virtues" not only insofar as it is essential to Cartesian virtue, but also insofar as it leads to develop the character traits commonly called virtues – respect for others, humility, courage, kindness, affability, helpfulness, and the like – as well as the temperance that comes with the regulation of the passions. Second, while he does admit virtue might come naturally to some, Descartes acknowledges the importance of moral education. He writes:

Although there is no virtue to which good birth seems to contribute so much as that which makes one esteem oneself only at his true worth, and although it is easy to believe that all the souls God puts in our bodies are not equally noble and strong . . . it is certain nevertheless that good education is very useful for correcting deficiencies of birth. (*Passions* a.161; Descartes 1989: 109; AT 11:453)

Through a proper education we can come to understand that we have a free will and what it is to use that will well. Most will suffer the "deficiencies of birth" that occlude from view the fact of our freedom. We can nonetheless achieve the understanding requisite to virtue through a proper upbringing. A virtue ethics is typically concerned with both virtuous character traits and moral education and upbringing. Descartes's attention to these elements in the *Passions* helps to complete his own brand of virtue ethics.

Descartes's Virtue Ethics and His Metaphysics and Epistemology, Revisited

At the outset of my discussion, I suggested that we do better to read Descartes's metaphysics and epistemology and his ethics as tightly knit, and so to read his concern with the conduct of life as an ethical one. The examination of Descartes's virtue ethics has shown how his metaphysical and epistemological project serve to ground Cartesian ethics, but it also helps us to understand how his ethics drives his metaphysics and epistemology. Our understanding that we have a free will and our resolve to use it well, or generosity, is at the center of Descartes's account of virtue, but this same knowledge provides the key to Cartesian metaphysics and epistemology as evidenced by the method for avoiding error presented in the Fourth Meditation. There, recall, the meditator resolves to use his will well by only making judgments about what is perceived clearly and distinctly. One might well think that just as having the proper metaphysics contributes to virtue, so too might being virtuous contribute to our arriving at the proper metaphysics. Geneviève Rodis-Lewis (1987) has suggested as much in arguing that we should think of Cartesian generosity as the fruit of the tree of philosophy. For her, generosity is a seed-bearing fruit, and that seed, if properly cultivated, will grow into the tree of philosophy. In this way, morals is not simply one branch among the three branches of philosophy, but provides the "ultimate level of wisdom" by leading us to be virtuous and ensuring the tree of philosophy continues to thrive.

I want to conclude here by fleshing out Rodis-Lewis's metaphor a little bit. Generosity, recall, is the key to virtue by promoting virtuous character traits, but it is also key through the way it figures in our moral education and in the regulation of the passions. If generosity and virtue do contribute to our arriving at the proper metaphysics, we might well expect that Descartes's metaphysical works contain virtue ethical elements. In this section I show that the *Discourse* contains an element of moral education, and the *Meditations* involves the regulation of the passions.

Descartes's presentation in the *Discourse* of his metaphysics, epistemology, and scientific project begins, in Part One, from a concern with moral education. There, we find a selective autobiography of the author. While the details Descartes provides here have served his biographers, Descartes himself uses his own life story to frame the work. He writes:

My present aim, then, is not to teach the method which everyone must follow in order to direct his reason correctly, but only to reveal how I have tried to direct my own. One who presumes to give precepts must think himself more skilful than those to whom he gives them; and if he makes the slightest mistake, he may be blamed. But I am presenting this work only as a history or, if you prefer, a fable in which, among certain examples worthy of imitation, you will perhaps also find many others that it would be right not to follow. (1:112; AT 6:4)

Descartes here implicitly contrasts two pedagogical methods. The first, the one he is rejecting, involves handing down a set of rules of reasoning – presumably, the formal syllogisms proper to Aristotelian logic – which are deemed authoritative without question. A good student, to reason well, is then to apply those rules appropriately. One who applies those rules well is to be praised, one who does not is to be blamed. Descartes's own preferred way of teaching how to reason well is one associated with moral education. We learn how to behave properly, on this method, by following the example of others. Perhaps we might come to critically evaluate common practices, but we learn them first, even learning from example how to evaluate critically. In a similar way, Descartes holds himself and his own reasoning up as an exemplar. We are to follow him in his way of thinking, and assess for ourselves whether his method is a viable one, that is, whether it is worthy of its exemplary status. Descartes effectively asks us to either blame or praise him in proportion to the degree to which his method gets us to the truth, not insofar as he follows rules.

In Part One of the *Discourse*, then, we get insight into how Descartes conceives of a good education. The model of a good education has all the qualities of the sort of moral education associated with a virtue ethics, and as we have seen, Descartes does think that a good education promotes virtue. Here, however, we see that that same education will also lead us to the proper method for conducting our reason, and so, for Descartes, to a true metaphysics and success in acquiring scientific knowledge.

In the *Meditations*, too, Descartes's metaphysical and epistemological effort is intertwined with virtue ethical considerations, and in particular the regulation of the passions. The meditator's passions surface throughout the work. Famously, the work begins with a desire "to establish something firm and lasting in the sciences" that leads

to the skeptical arguments. Often overlooked, however, the conclusions of those arguments lead the meditator to feel "like a prisoner who has *enjoyed* an imaginary freedom while asleep; as he begins to suspect that he is asleep, he *fears* being woken up and goes along with the pleasant illusion as long as he can" (AT 7:23). We are thus initially presented with a meditator of timid character, full of doubts, hesitation, and fear. By the end of the work, the meditator exudes a temperate confidence. He has answered the arguments that had initially caused so much anxiety. His fear has been transformed into a laughter at the ridiculousness of his previous doubts (see AT 7: 89). Moreover, the work is punctuated by expressions of the passions, each of which seems to mark a moment in the meditator's development. For instance, once the meditator has better understood the nature of sensation in the Second Meditation, this fear shifts to an amazement that he is so inclined to slip into his old habits, and a shame at "having doubts based on the forms of speech that the common people have invented" (7:32). And at the crucial point of the work, at the end of the Third Meditation when the meditator recognizes that God exists and is the cause of his nature, the meditator pauses "to gaze with wonder and adoration on the beauty of this immense light [the nature of God], so far as the eye of my darkened intellect can bear it" (7:52). (For discussion of this point in more detail, see Shapiro 2005.) It does seem that over the course of the *Meditations* the meditator changes how he feels about things and regulates his passions.

Interestingly, the meditator's regulation of his passions runs in parallel with his growing understanding. The turning point seems to come at the end of the Third Meditation and in the Fourth Meditation. At the end of the Third Meditation, the meditator comes to understand properly his own nature as a finite being created and sustained by an infinite God, and yet potentially stamped with the "mark of the craftsman" (2:35; AT 7:51). In the Fourth Meditation, he comes to understand not only that he has a free will, but also how to use that will well in making judgments. This new self-understanding results in the method for avoiding error – to affirm only those ideas perceived clearly and distinctly – and a resolve to follow that method. The similarities to the *Passions'* notion of generosity are striking, and just as the generous person is master of his passions, so too does the meditator's new self-understanding lead him to regulate the passions that affected him early on. Equally, of course, this self-understanding propels the meditator forward to the resolution of his metaphysical and epistemological project. With his discovery of and commitment to method for avoiding error, he moves to ascertain the nature of material things, the real distinction between mind and body and the existence of the material world. He even has the confidence at the end of the Sixth Meditation to take some of his sensory experience as epistemically valuable. Again, Descartes's metaphysical and epistemological projects are tightly knit with a concern with our moral development.

Conclusion

Contrary to common wisdom, Descartes does have substantive views on ethics. Descartes's writings on ethics reveal him to be strongly influenced by the revival of Stoicism in the seventeenth century. Like the Stoics, Descartes sees a complete ethics,

or “perfect moral system,” as comprised of a set of rules governing all the actions of life. Some of these rules are highly particular, dependent on the particular circumstances of action. Others are general rules forming a set of fundamental principles guiding all our actions unconditionally. The maxims presented in the third part of the *Discourse* are best understood as these fundamental principles. The totality of rules for action, however, is not, as such, constitutive of his conception of the good. Rather, Descartes is a virtue ethicist; for him, virtue is our supreme good. For him, virtue is simply “a firm and constant resolution to carry out what reason recommends.” His is a peculiar account of virtue, in that it seems that merely having good intentions is sufficient for virtue. Nonetheless, it is an account that, unlike Stoic ethics, makes virtue achievable for all who strive to reason well. Reasoning well, for him, is a matter not only of having the proper metaphysics but also in having a proper sense of self. This proper self-esteem consists in generosity – the knowledge that one has a free will and the resolve to use that will well. In keeping with his being a virtue ethicist, Descartes shows some concern with the development of virtuous character traits, the regulation of the passions and moral education. I have further suggested that Descartes’s ethics – his concern with the conduct of life – is intertwined with the metaphysics and epistemology at the fore of his philosophical writings. This interconnection is revealed not only by the metaphor of the tree of philosophy in the Preface to the French edition of the *Principles*, but also in the way virtue ethical concerns figure in the *Discourse on the Method* and the *Meditations*.

Notes

- 1 Though Elizabeth requested her side of the correspondence remain private, Descartes clearly shared his side: his letters to Elizabeth were published by Clerselier in his three-volume edition of Descartes’s correspondence published shortly after Descartes’s death. Descartes also shared Elizabeth’s side of the correspondence with Queen Christina, without Elizabeth’s permission.
- 2 In the *Meditations* Descartes seems to draw a distinction between the epistemically virtuous and the epistemically continent in his account of judgment in the Fourth Meditation. He writes: “If, however, I simply refrain from making a judgment in cases where I do not perceive the truth with sufficient clarity and distinctness, then it is clear that I am behaving correctly and avoiding error. But if in such cases I either affirm or deny, then I am not using my free will correctly. If I go for the alternative which is false, then obviously I shall be in error; if I take the other side, then it is by pure chance that I arrive at the truth, and I shall still be at fault since it is clear by the natural light that the perception of the intellect should always precede the determination of the will.” It is not enough that our judgments are true. We must have arrived at the truth in the right way, for the right reasons.

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Part IV

Descartes's Legacy

Chapter 27

Descartes's Legacy in the Seventeenth Century: Problems and Polemic

THOMAS M. LENNON

Descartes altered both the substance of philosophy and the style of doing it. He bequeathed an unprecedented concern with epistemology that dominated the early modern period and is with us still. The fact and significance of this legacy are beyond question. In addition, he emphasized the role of the individual thinker in the conduct of philosophy, and did so in a way that led to dispute, factionalism, and sectarian wrangling, with all the trappings of dogmatism. His contribution in this respect is less well known, harder to pin down, and, as will be seen by the end below, open to various interpretations.

The aim here will be to discuss this turbulence in the long seventeenth century, or its echo in the exactly 100-year period from the publication of Descartes's *Discourse on the Method* (1637) to Hume's letter on the eve of the publication of his *Treatise* to Michael Ramsay, in which he advises his friend that to facilitate comprehension of the "metaphysical Parts of [his] Reasoning," a reading of Descartes's *Meditations* would be useful (August, 1737; Popkin 1980 reprints the letter). There were three other works similarly recommended by Hume: Berkeley's *Principles*, Malebranche's *Search After Truth*, and Bayle's *Dictionary*. Not incidentally, each of these three authors could have said of his work's relation to Descartes exactly what Hume said of his own. The significance of Hume's advice is not just the recognition of Descartes's preeminence in the *history* of philosophy to that point, but of his continuing importance as a force in then-*contemporary* philosophy, almost exactly a half-century after the publication of Newton's *Principia* (1686), the work that perhaps most led to his demise (Sebba 1970). In other words, the legacy treated here is Descartes's living legacy.

An obvious key to Descartes's philosophy is his concern with certainty. On topics to be covered here, his quest for certainty led him to espouse a mind-body dualism, to locate the source of his initial certainty in subjective consciousness, and to bridge the cognitive gap between consciousness and its subject by a new theory of ideas and intentionality. Needless to say, there were difficulties in his theory, and not everyone accepted it, even some of those who might have begun as sympathetic to his cause.

It is not too much of a Procrustean bed to take the philosophical world immediately after Descartes as largely, if imprecisely, divided into his followers, or would-be followers, and their opponents. The division was basically in response to the metaphysical core of Descartes's system, which takes the essence of (immaterial) mind to be thought

and the essence of (material) body to be extension. This core was defended in various ways by the Cartesians; most notably, Antoine Arnauld (1612–94), the great Jansenist who began as an early critic of Descartes only to become his ablest defender; Nicolas Malebranche (1638–1715), the Oratorian who tried to make Descartes compatible with St. Augustine; Pierre-Sylvain Regis (1632–1707), whose *Système* was the textbook of Cartesianism that Descartes began in his *Principles* but never finished; and Robert Desgabets (1610–78), whose work has only recently been published, but who was described by his student Regis as “one of the greatest metaphysicians of our century.” Their opponents generally espoused skepticism against the metaphysical core; most notably, Pierre Gassendi (1592–1655), Simon Foucher (1644–96), John Locke (1632–1704), and Pierre-Daniel Huet (1630–1721).

Introduction

It is generally acknowledged that Descartes’s principal legacy, not just in the seventeenth century, but also in the whole of the modern period to the present, is what Gustav Bergmann dubbed the *epistemological turn*. Because of Descartes, the development of philosophy since his time has been driven by questions ultimately related to theory of knowledge. At the end of the early modern period, for example, Kant raised what he called the transcendental question: how is synthetic *a priori* knowledge possible? Kant asked how we can have non-tautological knowledge independent of experience, and in response to the question produced the larger part of his philosophy (Körner 1955: esp. ch. 1). One variation on Kant’s answer drove German idealism through the nineteenth century; and early in the twentieth century logical positivism, which in one fashion or other has itself driven philosophy ever since, was still grappling with Kant’s question (Friedman 1999).

Descartes himself was led to the epistemological turn by a concern for certainty. One interpretation that currently enjoys wide credence has it that Descartes set out to refute skepticism, which was rampant at the time. According to the first and most influential version of this interpretation, Descartes set the standard for certainty so high that his project necessarily failed (Popkin 2003: chs. 9–10). To be sure, for various reasons, both philosophical (e.g., the translation and propagation of the work of Sextus Empiricus) and extra-philosophical (e.g., the upheavals then taking place in every intellectual domain from physics and astronomy to religion and politics), there was a revival of skepticism to an extent not seen since antiquity. But while Descartes was undeniably in search of certainty, his references to skepticism are few (neither the term nor any of its cognates so much as appear in the *Meditations*); when he does refer to skepticism it is generally in response to some critic; and his references are invariably contemptuous (for he thinks that skeptics are all either liars or hopeless naïfs). It would seem, then, that the project that Descartes bequeathed to later philosophy did not involve any attempt to refute skepticism.

An important and obvious part of Descartes’s own epistemological turn involved what has come to be called foundationalism, the view that proper knowledge needs to be grounded on an unshakeable foundation. The very metaphor that has characterized this view is to be found in the opening few sentences of the *Meditations*. There, Descartes

argues that if what he hoped to do in the sciences was to have any stability or endurance, he needed to demolish the falsehoods he had acquired and to begin anew on secure foundations. Posterity has not been receptive to foundationalism, certainly not in recent times, and still less to Descartes's version of it. But the history of modern philosophy might nonetheless be described as a series of footnotes to Descartes in the same way that the history of western philosophy is thought to be a series of footnotes to Plato. In each case, the contribution of the author is significant less for the answers he advances than for the questions he raises. Descartes's failure in this regard, if that is what it was, remains the foil to most attempts at an alternative to foundationalism. If certainty is not grounded in some foundation, then it must be justified in some other way. In any case, Descartes's epistemological turn led philosophy in the direction of subjectivity and a preoccupation with the question less of *what* we know than of *how* we know it. As will be seen below, both of these results are reflected in the early modern "new way of ideas."

There is another, less obvious, and more interesting version of Descartes's epistemological turn that makes him out as philosophical revolutionary. When, with his method of doubt, Descartes undertook the demolition of all his former beliefs, he was aiming at the radical replacement of all extant systems of philosophy with one that was to be entirely new, or at least entirely recast (Schouls 1989: 14). His legacy in this regard can be understood even more broadly in political terms. As in political revolutions, most notably that in France of 1789, we find disagreement leading to turmoil, often violent, not just between supporters and opponents of the revolution, but increasingly among the supporters themselves.

Part of Descartes's revolutionary legacy is to reject all philosophical authority and to write as if having inherited nothing from any previous philosophy. Thus in the *Meditations* there appears no proper name save that of the divinity. In the *Discourse* we find only the name of the rather obscure figure Raymond Lull, safely referred to with contempt as providing the art of "speaking without judgment about matters of which one is ignorant." When he cannot avoid referring there to the great physiologist William Harvey, Descartes does so by calling him simply "an English physician," as if any country sawbones in England might have discovered the circulation of the blood – the same Harvey who also understood, as Descartes never did, the role of the heart in that process (1:119, 136; AT 6:17, 50). Descartes peddled his alleged philosophical creation *ex nihilo* despite his now-obvious debt to his predecessors. Since the work of Etienne Gilson, there has been an industry detailing Descartes's sources in precisely those Scholastics he seems most intent on ignoring. Nonetheless, the upshot was that Descartes left behind an unprecedented concern for novelty and originality. Thus, on the philosophical concept of substance, for example, which is central to Descartes's system, those who read him managed to come up with views of their own that distinguished themselves from each other and from him. They did so by exhausting all the logical possibilities on the topic: there are finitely many substances, there are infinitely many, there is exactly one, there are none at all. And of course, the aversion to proper names persisted in Berkeley, Leibniz, Spinoza, and Hume, who were the ones holding these views on substance. Ironically, no one was read more by these successors, whether directly or not, than Descartes himself. This brain-in-a-vacuum approach to philosophy has persisted throughout the modern period, the notable exception being

Pierre Bayle, the intertextualist whose *Historical and Critical Dictionary* (first edition 1697) was a near-fanatical attempt to identify and especially to correct previous scholarship. Only in recent years has philosophy emerged from the brain-in-a-vacuum approach to engage something like a communal project as the literature review has become a standard practice of scholarship. Appeals to philosophical authority are still not admissible, but at least dialogue with others is respectable and required.

With his rejection of the communal project, Descartes precipitated an unprecedented degree of philosophical controversy. To be sure, philosophical controversy does not begin with Descartes, for it is the engine of philosophical activity in all periods. Dialectical exchange is of its essence, such that even if philosophy can be pursued in isolation, as when Richard Rorty, for example, thinks of us individually in conversation with the great philosophers of the past, it is not a solitary occupation, for the conversation must be there for us to engage. G. E. Moore, who knew something about the problems of philosophy, once said that but for his philosophical reading he would never in his life have thought of a philosophical problem. The difference introduced by Descartes is that however sharp the disagreement among previous philosophers, they seem to have felt themselves part of a common project. With Descartes, the project is entirely new, and, as his bequest, it is new for each successive philosopher.

The entire previous history of philosophy confirms this concept of a communal activity, revealing a self-consciously accretive, even syncretic tradition to the point even of practicing a form of intertextuality. When the Academic skeptics of antiquity proclaimed that nothing is known, they took themselves to be true Platonists, adhering to Socrates' dictum that all he knew was that he knew nothing. Aristotle, before giving his own view on a given subject such as the soul, first rehearses the views of his predecessors (*De Anima*, bk. 1, ch. 2). The vehicle of medieval philosophy was the gloss, a commentary on all the texts, on both sides, relevant to a given question. So, for example, before Aquinas sets out his famous five ways of proving the existence of God, he first catalogues the extant arguments on both sides of the question as to whether it is even possible to prove the existence of God. (Not incidentally, these arguments were ecumenically derived via Jewish and Arabic sources from the pagan Aristotle.) The last of the great Scholastics, Francisco Suárez, whose lifetime overlaps Descartes's, and who was an important source for him, continues the gloss tradition. In a text that, ironically, Descartes drew upon for his theory of distinctions, Suárez turns to the "heart of the question, various opinions" (Suárez 1947: 21). Gassendi, Descartes's contemporary and principal competitor, notably extended the medieval style of philosophizing to the point that for him history, philosophy, and physics were of a piece (Joy 1987: chs. 8, 9, esp. pp. 208–9). If Gassendi was a methodological conservative, the anti-Cartesian Leibniz was a reactionary, not just in his attempt to restore the Aristotelian substantial forms that Descartes had banished, but in his insistence on what Thomists have called the "perennial philosophy."

Descartes's place in this scheme shows just how revolutionary he was. For his aim was the elimination of all previous views, even if his replacement views should nominally contain the same content as previous ones. The situation is parallel to his procedure in the *Meditations*, where with the method of doubt Descartes calls into question and even treats as false all that he previously held as true. Later, with his new metaphysical foundation in place, much of what he previously held and then set aside is

readmitted, but in a way that makes those views his own rather than the dictates of someone else. He accepts them because he himself sees them to be true, not because some alleged authority says they are true. We can thus better understand Descartes's apparent stubbornness against his critics, particularly in the *Objections and Replies* concerning the *Meditations*. At the end of the *Discourse on the Method*, Descartes had invited those with any objections to what he had written to convey them to his publisher so that they might be answered. He also promised to acknowledge his errors "very frankly" (1:149–50; AT 6:75–6). In the event, he offered two clarifications of significance in the preface to the reader of the *Meditations*, one on the nature of the mind, the other on the nature of an idea. Before its publication, the *Meditations* was circulated among leading philosophers and theologians. Said Descartes to Mersenne, the broker of this circulation, "I will be very glad if people put to me many objections, the strongest they can find, for I hope that the truth will stand out all the better from them." But Descartes's response to what he received was basically the same as his response to the initial set of objections. "The objectors seem to have understood absolutely nothing of what I wrote, and merely to have read it through post-haste. They merely oblige me to repeat what I have already said, and this is more troublesome than if they had put forward difficulties which gave more exercise to my mind" (3:171–2; AT 3:293, 297). The fact is that Descartes hardly ever changed a word of what he wrote, and certainly never relinquished a view, in response to criticism.

His followers were no less intransigent, even, and especially, when claiming to follow his views. A good example is the dispute between Malebranche and Arnauld over the nature of ideas. This intramural dispute between two Cartesians was more violent than almost any between the Cartesians and their opponents. It was bitter, extensive, and consuming. Perhaps not surprisingly, it began with an issue in theology, the doctrine of grace, his views on which, according to Malebranche, could not be understood without an appreciation of his view on ideas. Investigating that view, Arnauld did not like what he found, and there ensued a polemic over the next decade, with multiple extensive exchanges, some published even beyond Arnauld's death in 1694. The generally high quality of polemic did not suffer from the incredible rapidity with which it was produced, but did when it too often declined into *ad hominem* arguments and personal recrimination.

Another good example of strife based on apparent Cartesian dogmatism was the reaction to the atomism of the would-be Cartesian Gérauld de Cordemoy. Commenting on this abandonment of Descartes's identification of matter and space, one Cartesian wrote to another: "Cordemoy thoughtlessly causes a schism that is all the more serious since it removes from the true philosophy one of its strongest columns," and builds up that of Descartes's rival Gassendi (Clerselier to Desgabets, quoted in Lennon 1993: 23). The very term "schism" is one whose typical use is in religious controversies.

Mind-Body

An important part of Descartes's legacy, both in the seventeenth century and even more so in recent philosophy, is the so-called mind-body problem. This issue is not a single problem, but a nest of related problems concerning the connections between

mind and body. The problems were generated by the metaphysical core of Descartes's system that he arrived at in his search for certainty.

There were two problems in particular: first, how it is that the body can act on the mind and cause sensations such as pain and color, which are modes of the mind; and second, how it is that through volition the mind is able to move the body. The latter was explicitly raised as a problem for Descartes by Princess Elizabeth of Bohemia (to whom Descartes was soon to dedicate his *Principles of Philosophy*). Her concern was that the soul, or mind, seems incapable of affecting the body in order to bring about voluntary actions. According to Descartes, she argued, initiation of motion depends on contact with its cause, which itself must have properties depending on extension, whereas both contact and extension are precluded from the mind (May 6/16, 1643; AT 3:661). In his reply, Descartes tried to join the mind and body that in Meditation Six he had disjoined, or at least to qualify their disjunction. There, Descartes had argued that mind and body are "really distinct," by which he meant that each is capable of existing without the other; although he held that mind and body are distinct, he also claimed that the two are united in any living human being. The upshot is an expansion of Descartes's tripartite division of simple natures in *Rules* 12, which included (1) purely intellectual natures, involving no corporeal image, whereby we represent to ourselves knowledge, doubt, or the action of the will; (2) purely material natures, "which are recognized to be present only in bodies, such as shape, extension, and motion"; and (3) notions common to both, which link other notions and ground our inferences, such as "things that are the same as a third thing are the same as each other" (1:44–5; AT 10:419). In reply to Elizabeth, Descartes introduces a new notion: "as regards the soul and the body together, we have only the notion of their union, on which depends our notion of the soul's power to move the body, and the body's power to act on the soul and cause its sensations and passions" (3:218; AT 3:665).

Just what this union is, or how it is supposed to account for sensation for example, has proven to be far from obvious, even in the most recent interpretive literature. One approach has been to construe the union between mind and body as nothing more than their interaction. An objection to this approach is that the union is supposed to be what makes the interaction possible, rather than being the very same thing. Another approach, called *trialism*, is to take the union as an expansion of Descartes's initial dualism in that sensations are now regarded as modes of something different from either mind or body. But this view seems contradicted by too many texts. A hybrid view is that sensations are, as Descartes repeatedly claims, modes of the mind, but only insofar as it is united to the body (Rozemond 1998: 172–3).

To the extent that the distinction between mind and body is preserved as a difference in their essences, any interaction between them seems precluded if, as many thought, cause and effect must be of the same essence. Such was the argument of the skeptic Foucher, whose conclusion was that since there undeniably is such interaction, the essences of mind and body cannot be the thought and extension that Descartes took them to be, and thus that Cartesian metaphysics completely breaks down (Watson 1987: part 2). However devastating this putative downfall might appear, it was little noticed in the seventeenth century, even among those most threatened by it. For one thing, the causal likeness principle was explicitly denied by such Cartesians as Regis,

for the Aristotelianism on which it had initially been based had been rejected by Descartes, among others, in no uncertain terms. Also rejected was the great chain of being, whose infinite gradation of perfection among all beings had made the action of the less perfect body on the more perfect mind problematic. Body was elevated by Descartes and most of his followers to the status of substance, ostensibly equal in perfection to that of the mind. Moreover, the Cartesians seemed to strip the body, if not the mind, of all action, reserving the real power of causation to God alone (Hatfield 1979). On the other hand, occasionalism, the doctrine that God is the only real cause, while states of finite substances serve as but occasions for God's operation, was not concocted, as is often thought, as an *ad hoc* explanation of otherwise impossible mind-body interaction. On the contrary, Malebranche, the best-known proponent of the doctrine, had independent arguments designed to show that mental states can no more be the cause or effect of each other than a moving body can be the cause of motion in another body with which it collides. That is, he takes the explanandum of the putatively *ad hoc* explanation to be a *prima facie* counter-example to that explanation (Lennon 1980: 810–18).

Subjectivity

An epiphenomenon of both the epistemological turn and the mind-body problem in this period is the birth of subjectivity. Descartes has been credited (or criticized, as by the late pope) for both. The basic idea is immediately apparent in the early stages of the *Meditations* where, according to his method of doubt, the first certainty he is able to achieve is of his own existence as a thinking thing. The shibboleth “I think, therefore I am” does not occur here as such – it first appeared earlier, in the *Discourse* – but it anyway captures his position: he is certain that he exists precisely insofar as he thinks. Only then is he in a position to establish the certainty of anything else: in particular, God, and the material world including his own body. The certainty is objectively valid – that he exists is true not only just for him, whatever that might mean, but universally – but it is a certainty about himself as a subject, a subject of thought.

This novel subjectivity came to be known in the period as the new way of ideas. The phrase was first used later in the century by Edward Stillingfleet, Bishop of Worcester, who saw in Locke's version of the new subjectivity a threat to religion (a threat that he had already seen explicit in the use to which the deist John Toland had put Locke's view). According to Locke, all our knowledge begins with ideas derived from sensory experience; but the ineluctable result of this view, according to Stillingfleet, is an epistemology which is insufficient for our knowledge of immortality, the existence of God and the Trinity, and which opens the way to the deism, freethinking, and Socinianism that is found in Toland and that in fact later came to full fruition in the Enlightenment (Lennon 1993: sec. 26). It looked to Stillingfleet, in fact, that Locke's theory of ideas made knowledge of anything but the contents of the mind itself impossible.

Now, what exactly Locke meant by an idea has been a matter of dispute from his own time up to the most recent interpretive literature. What is clear, in any case, is that his theory of ideas is a part of his account of the distinction between appearance

and reality, which in the period had a particular urgency, since the description of the real world offered by the New Science differed radically from the world as commonsensically perceived. An apple appears to have not only such real qualities as size, shape, and motion, but also such merely apparent sensory qualities as odor, taste, and color. The distinction itself between appearance and reality is at least as old as Parmenides (just as the distinction between the two sorts of qualities is to be found in antiquity with the earliest atomists). Descartes's monumental innovation was to make appearances, i.e., sensory qualities, entirely subjective, with one result that his method of doubt was far more radical than anything contemplated even by the ancient skeptics. Sextus Empiricus, for example, did not extend doubt to his own body, but began only with the external world beyond it (Burnyeat 1982). But with appearance in the mind and independent of body, even the existence of one's own body might therefore be doubted.

Descartes was followed in this account of appearance generally by the whole of the seventeenth century, which in this sense can thus be called the new way of ideas. A complication is that previously, an idea had not been subjective, but something with its own status independent of the mind, as, most notably, in the case of Plato's Forms, which he also called ideas and took to be more real than any mind or soul that knows them. (Even in apparently degenerate later cases, such as that of the religious icons of the early seventeenth century that were called ideas, they had an obvious status independent of minds; see Michael and Michael 1989). As will be seen below, Descartes can be interpreted in the Platonic tradition, as he was by Malebranche, with the result that ideas, which are to be distinguished from sensory qualities, are not at all the appearances of things, but their essence.

Ideas

The status of ideas was the core issue in the debate between Malebranche and Arnauld (Nadler 1989: 81–8). Given its alleged theological importance, Arnauld carefully investigated the Oratorian's theory of ideas, which as he saw it had two fundamental components: (1) we do not directly perceive material things, but only ideas that represent them; (2) these ideas are really different from, and independent of, our perceptions. Both of these components were thought by Arnauld to be false. According to Arnauld, ideas do not stand between us and material things, and they do not differ from our perceptions.

The debate soon became exceedingly complex and technical, but it might be schematically represented by saying that Arnauld had two prongs of attack. One was to argue on grounds of parsimony that the kind of ideas that Malebranche called for just are not necessary for knowledge; and, secondly, these ideas in any case would not do the job he thinks they do. So, for example, Malebranche argued that unless ideas are the exemplars in the mind of God he takes them to be, our knowledge cannot have the immutability, universality, eternality, necessity – in short, the objectivity we recognize it to have when we see that the geometry we use to know the material world is precisely the geometry that the Chinese would use to do so. What we actually *see* when we *look at* material things is an idea in the mind of God which represents material things to us.

Arnauld replied that on this view, which is supposed to be an account of perception, we do not perceive material things at all. It is as if one were to say that we do not see the satellites of Saturn but only the lens of our telescope, because we can see them only by means of the telescope. Arnauld agrees that ideas are necessary, but we still see things and do so directly.

Or, when Malebranche in what he takes to be his strongest argument tries to solve the *Meno* problem, Arnauld again points to the futility of the ideas he invokes. Malebranche tries to answer the question of how we can come to know anything we are seeking unless we already know it in order to recognize what we are seeking when we come across it. His answer is that God or Being is always present to the mind, and thereby too are present the ideas of all things, however confusedly, with the mind's only task to clearly sort them out. Arnauld derisively likened this account to instructions given along with a block of marble to a sculptor: in order to know what St. Augustine looked like, he needed only to chip away the excess parts.

The competing views might be seen to stem from different ways of dealing with the ambiguity that Descartes acknowledged in his use of the term *idea*. It might be taken either materially, he said, as an operation of the intellect, or objectively, as the thing represented by that operation (2:7; AT 7:8). Arnauld emphasizes the first notion, expanding it by saying that an idea of something and the perception of it are one and the same thing, and that thing is a mode of the mind. But that thing has two relations, one to the mind, of which it is mode, and the other to the object represented, the relation seeming to be that of identity as Arnauld picks up on still another of Descartes's views, viz. that the idea of a thing just is that very thing insofar as it is in the mind (2:74–5; AT 7:102). For Malebranche, it is not ideas but sensations that are modes of the mind, and they have no representational capacity at all. Pains are not *of* or *about* anything, and what is true of pains is true of all sensations such as colors and sounds. In Descartes's language, they are materially false, and so he takes Arnauld as incapable of avoiding skepticism. Ideas, by contrast, are the essences of things. Malebranche thus emphasizes Descartes's latter notion of an idea. It is what is known, which, given the characteristics it has of universality, etc., can only be in the mind of God.

Malebranche thus resists the subjective idealism of Berkeley, according to which the material things we perceive depend for their existence upon the mind's perception, in favor of the objective idealism of Plato, according to which the ultimately real are essences outside space and time. This is very much of a piece with another, conscious departure from an expressed view of Descartes's, viz. the creation of all truths, including those that are eternal. Descartes, in what he seems to have regarded as the metaphysical basis for his physics, held that all truth depends on God's decree in the way in which laws in a kingdom depend on the king. He is the efficient and total cause of the essence of things no less than of their existence (3:22–3, 25; 1:145; 151–2). This doctrine is at the source of the "radical Cartesianism" of Desgabets and Regis – radical both in the sense that it led to dramatic views that went beyond what Descartes had explicitly held, and in the etymological sense that was the root of Descartes's system that he himself had never fully developed (Schmaltz 2002: 17). This is the sense of their apparently paradoxical claim to being more Cartesian than Descartes himself (an attitude exhibited by Malebranche when he too departed from Descartes's expressed views).

Intentionality

Locke was led to his theory of ideas by his empiricist skepticism: all our knowledge is derived from sensory experience, but sensory experience never gives us knowledge of the real essence of things. All it ever yields is an appearance of things, which is what he calls an idea. Thus, an idea and only an idea is “whatsoever is the Object of the Understanding when a Man thinks” (Locke 1977: 1.1.8; 47). Locke’s conclusion in this and similar texts is not representationalism: we are never aware of a material world but only of a non-material proxy that stands between us and it. Rather, his view is that we never perceive the material world as it is in itself, only as it appears to us. Now, Descartes would accept the validity of Locke’s argument, but he rejects his conclusion, as is clear from the wax example from Meditation Two. How, then, did Descartes come to his theory of ideas (whatever that theory might be)?

One ingenious explanation is that Descartes’s theory of ideas is not, as is often thought, an epiphenomenon of his dualism; rather, the dependence is the other way around. Dualism is constructed to house the theory of ideas, which itself is independently constructed as an account of how we get information from the material world (Hausman and Hausman 1997: ch. 1). On this account, Descartes’s innovation is to invoke the idea as a primitive notion of intentionality (i.e., to explain how our thoughts can be of or about something other than themselves). He thereby sets the agenda for philosophy of mind in the early modern period, not just for Locke, but for Berkeley, Hume, and others as well (an agenda that also occupies recent functionalists such as Dennett and Fodor). Berkeley, for example, saw that realism depended on an act-object distinction which he repeatedly denied by appealing to perception of pain as a model of all perception. As there is no real distinction between pain and the perception of it – a pain just is the perception of it – so every object of perception just is the perception of it. Its being (*esse*) is its being perceived (*percipi*). That is, Berkeley’s idealism depends on the rejection of the intentionality of ideas. Ideas are neither of nor about anything other than themselves. Similarly, Hume makes the difference between an impression and an idea one of degree in liveliness and vivacity: an idea of red is just a dimmer perception of red than an impression of red, and the difference between an impression of red and an impression of blue is just a difference in *kinds* of impressions, not in their objects. Intentionality drops out as a primitive and perhaps altogether. If the result is idealism in the first case, it is phenomenalism in the second.

The threat posed by the demon deceiver of Meditation One is the possibility that the material world is not at all what we take it to be, or perhaps that it does not exist at all. This threat is overcome by the proof of God’s existence, which eliminates the demon deceiver and justifies acceptance of clear and distinct perceptions as true. Unless ideas are intrinsically intentional, however, there would be an even deeper threat. The demon might bring it about that we are mistaken about what the world is like even if our ideas are instantiated. The world might contain *x*’s and *y*’s, but our ideas that seem to be about *x*’s and *y*’s would in fact not be about them at all. Crudely put, we would not know what we are thinking about. A proof of God’s existence would not overcome this threat, for the very intelligibility of the proof depends on ideas that are not liable to this possibility. To show how this problem is avoided, Descartes introduces a theory whereby an idea must be caused by an archetype having at least as much formal reality

as the idea has of objective reality (Hausman and Hausman 1997: ch. 2, "The Secularity of the *Meditations*"). In fact, by drawing the rational distinction between an idea as an objective reality (i.e., as having a certain content or object) and an idea as a formal reality (i.e., as a mode of the mind), Descartes draws attention to just this problem and his solution to it. On the other hand, Hume, with his analysis of causation as constant conjunction, in principle allows anything to be the cause of anything else, and thus becomes the Cartesian evil demon that even God could not eliminate (Hausman and Hausman 1997: ch. 4). No wonder that intrinsic intentionality has no place in his system.

A consequence of Descartes's theory seems to be that just as all sensations are *materially* false – they are about nothing – all ideas, at least all simple ideas, are true (Hausman and Hausman 1997: 17). This initially implausible consequence is mitigated by the doctrine, introduced in Meditation Two and elaborated in Four, that error is a function of the will, whose function in judgment is to introduce precisely the logical complexity that makes it possible for ideas to be *formally* false. In any case, it is a position that is taken over, more or less explicitly, by the Cartesians and the rationalists generally. For example, Leibniz adhered to the position so closely that for him even sensations have objects they express. He rejected Locke's view that God "superadds" (i.e., attaches without any physical basis requiring it) ideas of secondary qualities to their causes such that what in fact causes the idea of red could have been instituted to cause the idea of blue, or even of sweet. Instead, a sensation stands in a necessary relation to its object as a geometrical figure does to a figure it projects at an angle, e.g., a circle and an ellipse. Arnauld, in the *Port-Royal Logic*, had a version of Descartes's clarity and distinctness principle according to which everything contained in the clear and distinct perception of a thing can be asserted of that thing, which he takes to be the basis of all knowledge (Arnauld 1993: 247). For Arnauld, the principle seems to be analytic, since he also construes the idea of a thing taken objectively and the thing itself to be identical.

Malebranche assigns the basis of all knowledge to a different principle, but one that he thinks follows from the clarity and distinctness principle above. His principle, a principle of intentionality, is that to think is to think of something, or that to think of nothing is not to think at all. He deploys the principle in an emendation of Descartes's ontological argument for God's existence, which he takes to be a "proof by simple perception":

We see that there is a God as soon as we see the infinite, because necessary existence is included in the idea of the infinite, or to speak more clearly, because we can only apprehend the infinite in the infinite itself. For the first principle of our knowledge is that nothingness is not perceptible, whence it follows that if we think of the infinite it must exist. (Malebranche 1980: 323)

Malebranche evinces here a strong conception of intentionality whereby the object not only must exist, but must be as it is perceived to be. The principle is found in Regis and especially in Desgabets, who expresses the view that one cannot think of nothing by saying that "the first operation of the mind," i.e., its simple conception, "is always conformed to its object" (Schmaltz 2002: 137). With this principle in hand he dismisses

skepticism as a non-starter; but without it, he thinks, Descartes is not in a position even to privilege his argument “I think, therefore I am,” which therefore does not have a place in Desgabets’s system. Desgabets thus joins Malebranche in resisting the subjectivity to which Descartes’s method of doubt had been an invitation. Unlike Malebranche, however, Desgabets does not take the object of thought to be an exemplar in the mind of God that guarantees the necessity, objectivity, universality, and permanence of what we know. For him, instead, these features of our knowledge are secured by the divine will, which, though perfectly free with a freedom of indifference, is nonetheless eternal and immutable. The result is that the substances God creates, which are the objects of our thoughts, are “indefectible,” as he says, and will never cease to exist or change in any way. A further result, however, is that there are no pure possibilities: the actual is the necessary, just as Spinoza was soon to declare – to the horror of all. Despite its basis in this extreme voluntarism, the view of Regis and Desgabets drew close to Spinoza on other points as well. For example, they all took individual material things to be merely modes of extension. Whether like Spinoza Desgabets and Regis also took individual minds to be mere modes of thought, and whether their individuation depends, like that of material modes, on our thought, are matters of dispute in the recent literature (Schmaltz 2002: 206–12).

Opponents of Descartes

The nineteenth-century historian of Cartesianism, Francisque Bouillier, said that “during more than half a century, there did not appear in France a single book of philosophy, there was not a single philosophical discussion which did not have Descartes for its object, which was not for or against his system” (Bouillier 1868, 1: 430). Although it is an exaggeration, Bouillier’s claim conveys an undeniable truth: Descartes dominates the seventeenth century to an extent that no one else even approximates. Still, even apart from its exaggeration, the claim is also misleading in that it suggests that the battle between Descartes and his opponents in this period was between two clearly defined camps. To be sure, there was a struggle in the period discernible as a continuation of no less than Plato’s battle of the gods and giants, the perennial struggle he saw between the materialists and the friends of the forms (Lennon 1993); but, to be very precise, this was not the battle between Descartes and his opponents. For one thing, there was nothing that linked the Cartesians together, no set of doctrines, or even a single doctrine on which they all agreed. Not even a veneration of the person of Descartes joined them as such, for many of his opponents also venerated him. Instead, there was a more or less comprehensive overlap of agreement on doctrines that formed a kind of family resemblance among them.

Nor was there a clearly defined camp of opponents of Descartes, who were even more heterogeneous than the Cartesians. To be sure, they could be very effective in concerted action against Descartes’s philosophical fortunes, as in their successful effort in the early 1660s to have his work placed on the Index of forbidden books, or in the 1670s when they got the French government to proscribe the teaching of Cartesianism in the schools. Yet often they differed as much from each other as from Descartes. Here are two examples of notable, but very different, opponents of Descartes, both of whom,

ironically but not uncommonly, owed early inspiration to Descartes. Locke's *Essay on Human Understanding* can be read as anti-Cartesian polemic from beginning to end, but there is not much beside his aversion to Descartes that connects him to Leibniz, whose *New Essays on Human Understanding* detail his differences from Locke. Yet the catalogue of Leibniz's criticisms of Descartes is just as long as Locke's: the mistaken rejection of final causes, the weak proofs of the existence of God, the insufficiency of clarity and distinctness as criteria of truth, the frivolousness of the method of doubt, the mistaken rules for the communication of motion (based on mistaken conceptions of motion, the essence of body, and its quantity conserved in collision), and so on.

On the Continent there was an important coalescence of opposition to Descartes's conception of history, especially the history of philosophy, that classed Leibniz together with some otherwise strange bedfellows, the skeptics Foucher and especially Huet (all three were correspondents of each other). For Descartes, all previous philosophy is in principle swept away by the method of doubt in favor of a new beginning by each philosopher. In practice, the history of philosophy came to be regarded by the Cartesians as a dustbin of mistakes, an attitude that expanded to include all scholarship, which Malebranche contemptuously dismissed as antiquarianism, a love for a (mistaken) past just because it was past. Without naming him, Malebranche clearly had in mind, as the model of this antiquarianism, Huet, who until that point had been, at least by his own account, a fellow traveler of Cartesianism (not unlike Locke and Leibniz). Huet was a polyglot, polymath historian of just the sort that Malebranche detested (for example, one of Huet's books, based on ancient sources, claimed to locate the exact place of the Garden of Eden), and so Malebranche ridiculed him in the *Search After Truth*. Urged on by Foucher, who earlier had engaged Malebranche on the historical authenticity of Descartes's deployment of skeptical doubt, Huet launched the most comprehensive, unrelenting, and devastating critique of Descartes's philosophy ever published (Huet 2003). Moreover, it dealt with just the topics in Descartes that have most concerned recent commentators, such as doubt, the *cogito*, criteria of knowledge, the circularity of the *Meditations*, proofs for the existence of God, etc.

The first edition of Huet's work, *The Critique of Cartesian Philosophy*, was published in 1689, and although Cartesianism was already in decline, a response from its partisans was inevitable. It came primarily from academics in Germany and the Netherlands. In France, the champion of Descartes's cause was Regis, who turned from his intramural debate with Malebranche over the nature of ideas, wherein he defended essentially Arnauld's position, to take on Huet. Regis's reply, the *Réponse* of 1691, was a fairly measured and accurate attempt to defend the philosophy of Descartes, even if at times it wandered from his actual views on such topics as the scope of the method of doubt, which Regis unduly restricted.

Such was Descartes's legacy in these matters that the debate was not likely to end so peremptorily, and thus Huet rejoined it with a much-expanded edition of the *Critique* in 1694, which dealt with the early parts of Regis's reply. Huet broke off this form of rebuttal by way of expansion, apparently having decided on a very different kind of response as more effective, viz. ridicule, the very tactic that had launched the controversy in the first place. Huet published a history of Cartesianism, the premise of which is that contrary to the reports of his death in Stockholm in 1650, Descartes was alive and well in the North, teaching philosophy to the Lapps. (The book declines thereafter

in plausibility, and, according to some, in taste as well). Dragged into polemic with the Cartesians, the courtly Huet lost all measure of reserve. Here, the vitriol found in the intramural dispute between Malebranche and Arnauld was generated in the extramural dispute between the Cartesians and their opponents.

Conclusion

The respect in which the Cartesians who rejected Descartes's expressed views nonetheless felt themselves more Cartesian than Descartes himself regarded his principal rule of method, to accept as true only what is clearly and distinctly perceived to be true. Each is enjoined to tell it as he or she sees it, and the Cartesians did so, especially on the important substantive issues raised and bequeathed by Descartes. So, if Malebranche finds that Descartes nods over even such an important issue as the nature of ideas, the Cartesian thing he did is to correct Descartes's error. As Descartes himself had acknowledged, however, the fact is that people can be mistaken in believing they clearly and distinctly perceive some truth. Indeed, they can literally go to the stake for what they take to be the clearly and distinctly perceived truth, knowing that others do exactly the same for contradictory views (2:194–5, 250; AT 7:278–9, 361). Though the Cartesians are realists, committed to the discovery of the single, universal, and objective truth of every matter, they are in fact liable to perennial discord about what that truth is.

Their opponents in the battle of the gods and giants have a different prospect. These nominalists, beginning with Hobbes and continuing with Locke, see philosophy as having primarily instrumental value in getting people to agree in social and political matters. They avoid conflict, or seek to minimize it, but pay a different price as they veer toward relativism, as in the strain of Hume's philosophy that concerns itself with the causes of belief rather than its truth. The communal model of philosophizing prior to Descartes fits their practice, although even among them there is a premium on novelty and originality. (Proper names are hardly less scarce in the work of the empiricists than in the rationalists.) Indeed, these authors are among the most distinct and distinguished personalities of the period, hardly less committed to intellectual autonomy than the Cartesians. (Ironically, skeptics such as Huet are rather an exception to this general trend.) Descartes's dual legacy of substance and even of style thus transcends the battle of the gods and giants and in fact can be recast in more positive terms, since this period was by almost any standard the golden age of philosophy.

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Chapter 28

Contemporary Reactions to Descartes's Philosophy of Mind

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Overview

It is widely assumed that Descartes's philosophy of mind is organized around three major commitments. The first is to substance dualism. The second is to individualism about mental content. The third is to a particularly strong form of the doctrine of privileged first-person access. Each of these commitments has been questioned by contemporary philosophers of mind. Substance dualism is generally regarded as a non-starter, individualism has come under attack from a number of different quarters, and the doctrine of privileged access has been watered down or rejected. Yet, at least as far as questions about mental content and privileged access are concerned, contemporary discussions still address what they represent as Descartes's views. More often than not crude parodies of these views end up as the focus of discussion, but more careful critics are usually prepared to recognize that Descartes's philosophy of mind is more subtle and nuanced than the parodies might lead one to suppose.

Responses to substance dualism, the view that mind and body are distinct substances one of which (body) is material and the other (mind) immaterial, fall into two main categories. There are those which question its coherence and those which reject it on empirical grounds. It remains to be seen which form of objection is more appropriate, but it is worth noting that some critics of substance dualism have been prepared to endorse another kind of dualism, a dualism of properties. According to this "dual aspect" version of dualism, mental properties are neither identical with nor reducible to physical properties, even though both mental and physical properties are properties or aspects of a single substance. This wouldn't have satisfied Descartes, but it may well be the best that can be done for dualism in the philosophy of mind.

Individualism is roughly the view that the thoughts a person can have does not depend on his or her relations to the physical or social environment. A person's thoughts are, in this sense, "world-independent." Individualism about the mental, also known as "internalism," is often attributed to Descartes on the basis of a reading of his thought experiments in the First Meditation. On this reading, Descartes is committed to individualism because he envisages the possibility of our being radically mistaken about the nature and existence of the world and of our thoughts remaining just as they are in these circumstances. In response, it has been claimed that it is a

mistake to move from the premise that our thoughts about the world could be radically mistaken to the conclusion that they are individuated individualistically and that there are in any case good independent arguments against individualism. From an anti-individualist perspective, therefore, Descartes's conception of mental content is of interest because it brings the defects of individualism into the sharpest possible focus.

The doctrine of privileged first-person access says that one's introspectively based judgments about one's own mental states enjoy a range of epistemic privileges that judgments about non-mental reality or the mental states of others do not enjoy. One of these privileges is infallibility or immunity to error. Immunity to error does not entail immunity to ignorance, but the strongest versions of the doctrine of privileged access insist on both forms of immunity. They claim that introspectively based judgments about one's own mental states can't be mistaken and that one can't fail to know what is in one's own mind. On the face of it both of these theses are too strong. Yet despite the fact that neither ignorance nor error can be ruled out with respect to many states of mind there does nevertheless appear to be something right about the doctrine of privileged access. For example, one might think that the basis on which one ascribes thinking to oneself is different from the basis on which one ascribes it to others and that at least some of one's judgments about one's own mind can't be mistaken. On this account the challenge is to explain the authority of self-knowledge without exaggerating its strength or scope.

As well as raising questions about the mind-body relation, mental content, and privileged access, Descartes's philosophy of mind raises questions about the relationship between these issues. Some materialist critics of dualism have argued that the doctrine of privileged access implies the falsity of materialism, and that arguments for materialism and against dualism are therefore also implicitly arguments against privileged access. Other commentators have represented Descartes as arguing for individualism on the basis that one's judgments about one's own thoughts are infallible. This has in turn sparked a debate between those who have been prepared to concede that one's epistemic access to one's own thoughts can't be privileged in this way unless individualism is true, and others who have argued that we can know our own thoughts in an authoritative manner even if individualism is false.

These are complex issues and matters are further complicated by questions about the strength of Descartes's commitment to dualism, individualism, and the doctrine of privileged access. One suggestion is that Descartes's position on the mind-body relation is actually a form of "trialism," according to which thoughts are assignable to mind, extension to body, and sensations to the union of mind and body. Others have drawn on the Third Meditation to argue that the attribution of individualism to Descartes is not well grounded. It is also possible to find commentators who read Descartes as holding that introspective judgments are only privileged up to a point and that such judgments are not absolutely immune to error. These questions of interpretation remain unresolved. Nevertheless, it is worth bearing them in mind, since they open up the possibility that contemporary responses to dualism, individualism, and the doctrine of privileged access are not necessarily responses to views which Descartes actually held. For the moment, however, let us ignore such interpretive worries and take a closer look at these responses themselves.

Dualism

P. F. Strawson writes somewhere that one of the marks of a really great philosopher is to have made a really great mistake. He goes on to argue that Cartesian dualism is one such mistake, its greatness consisting in the fact that it gives a “persuasive and lastingly influential form to one of those fundamental misconceptions to which the human intellect is prone when it concerns itself with the ultimate categories of thought” (Strawson 1974: 169). But why is Cartesian dualism a mistake? According to Strawson and many others the fundamental problem is that this form of dualism is not just false, but incoherent. For the notion of an immaterial Cartesian mind or soul to make sense it must be possible to specify criteria of singularity and identity for souls. That is to say, “we must know the difference between one such item and two” and “we must know how to identify the same item at different times” (Strawson 1974: 173). Since bodies are in space as well as time we can account for their singularity and identity in spatiotemporal terms. For example, we can appeal to the principle that two bodies can’t occupy exactly the same region of space at the same time. But the fact that immaterial souls are supposed to be non-spatial leaves us without any conception of what their singularity and identity consists in. That is why, according to the present line of thinking, Cartesian dualism is conceptually incoherent.

One response to this objection would be to argue that it is possible to count and reidentify souls by reference to the human beings or human bodies to which they are attached. Where there is one human being we assume that there is, or was, one soul attached to it and that sameness of human being implies sameness of soul. Yet it is not clear how this assumption can be justified. Strawson makes this point by means of the following example:

Suppose that I were in a debate with a Cartesian philosopher, say Professor X. If I were to suggest when *the man*, Professor X speaks, there are a thousand souls simultaneously thinking the thoughts his words express, having qualitatively indistinguishable experiences such as he, the man, would claim, how would he persuade me that there was only one such soul? (Strawson 1974: 174)

On the face of it, a substance dualist needn’t be troubled by this question. He might not be able to persuade an outside observer of this, but he may nevertheless claim to be directly acquainted with the singularity and identity of his thinking self. In effect, this amounts to the suggestion that one can be conscious that one’s thoughts belong to one and the same immaterial soul even if one is unable to give any informative general account of the criteria of singularity and identity for souls.

But is the identity of one’s own soul something with which one can be acquainted in this way? How can I rule out the possibility that what I am conscious of as one persisting soul is in fact a series of distinct souls each of which transmits its states of consciousness to its immediate successor? In response to these questions the substance dualist ought to argue that the simplest and best explanation of the evident unity of one’s consciousness is that one’s mental life is underpinned by a single soul rather than a succession of souls. To claim that this is the best explanation is not to claim that it can’t be mistaken, but the fact that one can’t completely rule out the “multiple

souls" hypothesis doesn't show that it doesn't make sense to talk about the singularity and identity of souls. The most that can be said is that the dualist who claims consciousness of the singularity and identity of his immaterial soul faces an epistemological problem, but Strawson's point was supposed to be conceptual rather than merely epistemological.

It is easy to overlook the distinction between epistemological and conceptual considerations if, like Strawson, one subscribes to the verificationist principle that "you do not know what souls are unless you know how to tell one from another and to say when you have the same again" (Strawson 1997: 51). Given this principle, it is tempting to argue for the incoherence of substance dualism on the basis that one can't tell one soul from another on a suitably strong reading of "tell." Yet, as we have seen, the singularity of souls is something for which the unity of consciousness might be seen as providing at least defeasible evidence and it is not clear in any case why one should accept Strawson's verificationism. So we still lack a conclusive demonstration of the incoherence of Cartesian dualism.

This has prompted some philosophers of mind to pursue a different line of argument against dualism. For example, Parfit explicitly rejects the suggestion that the concept of a Cartesian soul or ego is unintelligible and concedes that there might have been evidence supporting the Cartesian view. Specifically, if there was sufficient evidence for reincarnation we might reasonably conclude that a Cartesian ego is what each of us really is. The problem, according to Parfit, is that we lack good evidence for the belief in reincarnation. Hence, "even if we can understand the concept of a Cartesian Pure Ego, or spiritual substance, we do not have evidence to believe that such entities exist" (Parfit 1984: 228). Unlike Strawson, therefore, Parfit and others like him reject Descartes's dualism on empirical rather than conceptual grounds.

It remains controversial whether the rejection of Cartesian dualism on empirical grounds is warranted or whether it is appropriate to criticize Descartes's position on anything other than conceptual grounds. What is clear is that few contemporary philosophers of mind regard substance dualism as a serious option. They assume that there are decisive objections to it, but they often fail to spell out these objections in any detail. Parfit's approach has not gained widespread acceptance and it continues to be assumed, often without much argument, that substance dualism makes no sense. While this might ultimately be the right thing to think, we have seen that the charge of incoherence is less easy to justify than one might initially have supposed. Faced with the objection that substance dualism can't account for the singularity and identity of souls, there are several points at which the dualist can dig in his heels, and the same goes for other standard arguments for the incoherence of dualism. If this is right then substance dualism has been rejected rather than refuted.

Nevertheless, it is easy to see why substance dualism looks so much less attractive to us than it did to Descartes. If we think of the world as the natural world and as causally closed there won't be any room in it for a "separate realm of mental substance that exerts its own influence on physical processes" (Chalmers 1996: 124–5). If there is a sufficient physical cause for every physical event "there is no room for a mental 'ghost in the machine' to do any extra causal work" (Chalmers 1996: 125). What, in that case, would a naturalistic conception of mind look like? A reductive naturalism would not only make no room for a separate realm of mental substances, but also regard

mental properties like pains as identical with physical properties like C-fiber firings. This is the view of type-type identity theorists such as U. T. Place, J. J. C. Smart, and D. M. Armstrong. Yet this form of reductive naturalism has been widely criticized and one cannot fail to be struck by the Cartesian overtones of some of the best-known criticisms.

Consider Saul Kripke's anti-materialist argument in *Naming and Necessity*. Kripke argues that "the identity of pain with the stimulation of C-fibers, if true, must be *necessary*" (Kripke 1980: 149). At any rate, this is what one would expect if such type-type identities are analogous with such scientific type-type identifications as the identity of heat with molecular motion. Yet the possibility, or apparent possibility, of C-fiber stimulation without pain and pain without C-fiber stimulation suggests that the correspondence between the two has "a certain obvious element of contingency" (Kripke 1980: 154). This apparent contingency cannot be explained away in the way that the apparent contingency of the correlation between heat and molecular motion can be explained away. In the latter case there is a distinction to be drawn between heat and the sensation of heat so that the apparent possibility of molecular motion without heat is really only the possibility of molecular motion without the sensation of heat. But to conceive of C-fiber stimulation without the sensation of pain is to conceive of C-fiber stimulation without pain; there is no distinction in this case between pain and the sensation of pain. Thus, when God created the world, all he needed to do to create heat was to create molecular motion. But when he created C-fiber stimulations he still had more work to do to create pain, that is, to ensure that C-fiber stimulations are felt as pain.

Like Descartes, Kripke takes it that a certain kind of conceivability is a guide to possibility. Descartes argues for a real distinction between mind and body on the basis that they can be understood or conceived of apart from one another. Analogously, Kripke argues for the non-identity of pain and C-fiber stimulation on the basis that each can be conceived of as existing without the other. Kripke's intuitions are, in this sense, Cartesian and he relies on his Cartesian intuitions to argue for the falsity of some types of materialism. Yet Kripke is no Cartesian dualist. In his view, a person could not have come from a different sperm and egg from the ones from which he actually originated. This "implicitly suggests a rejection of the Cartesian picture" (Kripke 1980: 155 n.77) because there is no obvious reason why an immaterial soul should have any necessary connection with a particular sperm or particular egg.

One alternative to Cartesian dualism is what Chalmers calls "naturalistic dualism." Chalmers argues consciousness is not logically supervenient on the physical in the sense that "all the microphysical facts in the world do not entail the facts about consciousness" (Chalmers 1996: 93). One argument for this claim appeals to the logical possibility of zombies. My zombie twin is molecule-for-molecule identical with me, but lacks conscious experience entirely. If such a zombie is conceivable that is enough to establish that consciousness cannot be reductively explained. Yet it doesn't follow from the fact that consciousness doesn't supervene logically on the physical that it doesn't supervene naturally on the physical. The naturalistic dualism for which Chalmers argues is a form of property dualism. The idea is that "conscious experience involves properties of an individual that are not entailed by the physical properties of that individual, although they may depend lawfully on those properties" (Chalmers 1996: 125).

What makes this a form of naturalism is its insistence that "we can *explain* consciousness in terms of basic natural laws" (Chalmers 1996: 128). Accordingly, consciousness turns out to be just another natural phenomenon even though conscious properties can't be reduced to physical properties.

The limited concessions to dualism that writers such as Kripke and Chalmers are prepared to make have to do with their conception of the nature of consciousness and of the relation between conscious properties and physical properties. Yet there are also intentional states which lack any distinctive conscious character. What makes a pain a pain is the way it feels to its subject, whereas what makes the belief that George W. Bush is the American President the belief it is isn't the way it feels to believe that George W. Bush is the American President. There isn't anything specific that it is like to have this belief in the way that there is something it is like to be in pain. Rather, the belief that George W. Bush is the American President is the belief that it is partly in virtue of its logical or normative relations to other beliefs. Some have seen this as undermining any attempt to identify beliefs with physical or functional properties. Yet this doesn't count in favor of Cartesian dualism any more than the failure of materialist explanations of consciousness counts in favor of Cartesian dualism. The appeal to a non-physical mind is of no help in either case since it is quite obscure how it is any easier to explain consciousness or intentionality in non-physical terms than it is to explain them in physical terms. What contemporary philosophers have extracted from Descartes's philosophy of mind is therefore not a solution to the mind-body problem but a sense of its depth and intractability. The last word goes to Kripke, who concludes his discussion with the observation that the mind-body problem is "wide open and extremely confusing" (Kripke 1980: 155 n.77).

Individualism

Individualism can roughly be characterized as the view that "one's mental phenomena are in certain fundamental ways independent of the nature of the empirical and social worlds" (Burge 1986: 120). More precisely, it is the view that

an individual person's or animal's mental state and event kinds . . . can in principle be individuated in complete independence of the natures of empirical objects, properties, or relations (excepting those in the individual's own body, on materialist and functionalist views) – and similarly do not depend essentially on the natures of the minds or activities of other (non-divine) individuals. (Burge 1986: 118–19)

According to Burge, "individualism as a theory of mind derives from Descartes" (Burge 1986: 117). Specifically, it derives from a particular reading of Descartes's thought experiments in the First Meditation. What these thought experiments show is that our beliefs about what the empirical world is like could be radically mistaken, and this might lead one to conclude that the individuation of thoughts is unaffected by possible differences in the environment. Yet, Burge argues, no such conclusion is warranted by Descartes's thought experiments. We can concede that our thoughts about

the world might be radically mistaken without conceding anything about “how our thoughts about the world are determined to be what they are” (Burge 1986: 122).

If it is true that Descartes is committed to individualism then arguments against individualism are also arguments against Descartes’s philosophy of mind. Many such arguments have been proposed. A key paper in this connection is Hilary Putnam’s “The Meaning of ‘Meaning’.” Putnam imagines a planet called Twin Earth which is exactly like Earth except that the liquid called “water” on Twin Earth isn’t H_2O but a different liquid whose long chemical formula we can abbreviate as “XYZ.” XYZ is indistinguishable from water at normal temperatures and pressures, and the oceans and lakes of Twin Earth contain XYZ rather than water. Now imagine a time when a typical Earthian speaker of English – call him Oscar₁ – didn’t know that water is H_2O and when the typical Twin Earthian speaker of English – call him Oscar₂ – didn’t know that “water” is XYZ. Even if the two Oscars were “exact duplicates in appearance, feelings, thoughts, and interior monologue, etc.” (Putnam 1975: 224), the extension of the Earthian term “water” – the stuff that the term was true of – was still H_2O at this time and the extension of the Twin Earthian term “water” was still XYZ. In this sense the two Oscars understood the term “water” differently even though they were in the same psychological state. Putnam’s conclusion is that “the extension of the term ‘water’ (and, in fact, its meaning in the intuitive preanalytical usage of that term) is *not* a function of the psychological state of the speaker by itself” (*ibid.*).

This is not yet an argument against individualism. Indeed, the suggestion that Oscar₁ and Oscar₂ are exact duplicates in feelings, thoughts, and interior monologue despite the difference in their physical environments looks like an argument for individualism rather than an argument against it. Yet there is an obvious objection to Putnam’s own reading of his example. The objection is that Oscar₂ couldn’t possibly be thinking thoughts involving the concept *water* since he has never had any contact with water or with anyone else who has had contact with water. Since Oscar₁ has been in contact with water and does employ the concept *water* in some of his thoughts, this is at least one respect in which their thoughts must be different. However, as Burge points out, this difference in their thoughts, in their mental states, derives from differences in their environments. This is now an argument against individualism, since this kind of dependence of the two Oscars’ mental phenomena on their physical environments is precisely what individualism is committed to denying.

Other Burgean arguments emphasize the way in which one’s mental states depend essentially on the nature of one’s social environment. Suppose, for example, that a patient has the false belief that he has developed arthritis in his thigh. This must be a false belief since arthritis is specifically an inflammation of joints. But now imagine a counterfactual situation in which the patient’s physical, behavioral, and dispositional history is exactly the same as in the actual world, but in which the word “arthritis” is conventionally applied to various rheumatoid ailments as well as to arthritis. In this counterfactual situation the patient lacks the belief that he has arthritis in the thigh. He couldn’t have picked up the concept *arthritis* because “arthritis” in the counterfactual community doesn’t mean *arthritis*. The upshot is that “the patient’s mental contents differ while his entire physical and non-intentional mental histories, considered in isolation from their social context remain the same” (Burge 1998: 28). This difference is attributable to differences in his social environment just as, in other

cases, differences in mental content are attributable to differences in the physical environment.

If successful, these arguments against individualism are also arguments against what Putnam calls "the assumption of methodological solipsism." This is the assumption that "no psychological state, properly so-called, presupposes the existence of any individual other than the subject to whom that state is ascribed" (Putnam 1975: 220). Putnam claims that this assumption is "pretty explicit in Descartes" (*ibid.*) and Fodor is making the same point when he attributes to Descartes the view that "there is an important sense in which how the world is makes no difference to one's mental states" (Fodor 1981: 228). But if anti-individualism is correct then how the world is does make a difference to one's mental states and there are psychological states which presuppose the existence of individuals other than the subject to whom the states are ascribed. The thoughts that one can think are constrained by the concepts that are available to one and the concepts that are available to one are not independent of one's physical and social environment.

Why, in that case, should contemporary philosophers of mind ever have been attracted by Descartes's alleged individualism or methodological solipsism? One explanation is that this approach is in keeping with the idea that mental processes are computational. As Fodor puts it:

Insofar as we think of mental processes as computational . . . it will be natural to take the mind to be, *inter alia*, a kind of computer. . . . If we want to extend the computational metaphor by providing access to information about the environment, we can think of the computer as having access to "oracles" which serve, on occasion, to enter information in the memory. . . . The point is that, so long as we are thinking of mental processes as purely computational, the bearing of environmental information upon such processes is exhausted by the formal character of whatever the oracles write on the tape. In particular, it doesn't matter to such processes whether what the oracles write is *true*; whether, for example, they really are transducers faithfully mirroring the state of the environment, or merely the output end of a typewriter manipulated by a Cartesian demon bent on deceiving the machine. (Fodor 1981: 230–1)

On this account, the computational picture of the mind makes sense of "the Cartesian claim that the character of mental processes is somehow independent of their environmental causes and effects" (Fodor 1981: 231). It also purports to provide the best explanation of the subject's behavior. It is what an agent has in mind – his beliefs and desires, for example – that causes his behavior. So if it turns out that the computational picture of what the agent has in mind is best placed to explain what the agent does, then that will be a powerful argument for the methodological solipsism to which this picture is committed.

It is controversial, to say the least, whether this argument for methodological solipsism is successful. In particular, it has been objected that the behavioral argument for methodological solipsism fails because it relies on an impoverished conception of "behavior." According to this line of thinking, explaining what an agent does is not just a matter of explaining a series of bodily movements or motor responses. What is required is an explanation of the agent's *actions*, and this means that "one cannot leave the truth or falsity of agents' beliefs out of account" (Hornsby 1986: 107). In this sense,

it does matter whether what the oracles write is true. It matters because “a person can be expected to do what she tries to do on occasion only if certain beliefs that explain her then trying to do that are true” (*ibid.*).

Be that as it may, methodological solipsists have other argumentative resources at their disposal. Perhaps the most influential argument for methodological solipsism or individualism is that we have privileged epistemic access to the contents of our own minds and that only individualism can explain how this is possible. For suppose that one’s mental phenomena are, as some anti-individualists maintain, dependent on the nature of one’s physical environment. In that case, given that one can be mistaken about the nature of one’s physical environment, it would seem to follow straightforwardly that one can also be mistaken about one’s own mental phenomena. So if one thinks that one can’t be mistaken about the contents of one’s own mind, then individualism about the mental looks like the only serious option.

To assess this argument we will need to take a closer look at the doctrine of privileged access. Before doing that there is an important historical question that needs to be addressed. The question is whether it is correct to read Descartes as an individualist. Consider his argument for the existence of God in the Third Meditation. Descartes argues for God’s existence on the basis that God must be the source of his idea of God. The implication is that the idea of God depends in a fundamental way on the thinker’s being embedded in a particular “cosmic” environment. And if the idea of God is, in this sense, “world-dependent,” then so are those mental contents in which this idea is deployed. It is therefore false, even by Descartes’s own lights, that how the world is makes no difference to one’s mental states.

In fact, this attempt to read Descartes as a proto-anti-individualist or “externalist” is too quick. The dependence that anti-individualism is interested in is the dependence of one’s mental states on the nature of the empirical and social worlds. Since God is not a constituent of empirical or social reality the dependence of the idea of God on God’s existence does not count against individualism. Indeed, it is interesting to note that Burge’s characterization of individualism explicitly addresses this issue. If, as he stipulates, individualism is the view that an individual person’s or animal’s mental state and event kinds do not depend essentially on the natures of the minds or activities of other *non-divine* individuals, the fact that there are ideas which depend on the nature or activities of God doesn’t look like placing Descartes in the anti-individualist camp.

Nevertheless, there is something right about the thought that there are elements of anti-individualism in Descartes’s thinking. Indeed, Burge concedes that his earlier attribution of individualism to Descartes was “badly grounded” (Burge 2003: 291). The principle to which Descartes appeals in the Third Meditation is that the cause of an idea must have at least as much formal reality as there is objective reality or intentional content in the idea, and this principle “seems distinctly anti-individualist in spirit” (Burge 2003: 293). This brings us back to the relationship between anti-individualism and the doctrine of privileged access. If it is true that Descartes subscribes to this doctrine, and that only individualism can make sense of the ways in which self-knowledge is epistemically privileged, then it might seem uncharitable to try to read Descartes as an anti-individualist. In practice, however, anti-individualists tend to argue that anti-individualism is compatible with respectable versions of the doctrine of privileged access. It is now time to consider whether they are right about this.

Privileged Access

The doctrine of privileged access is one element of what Ryle calls "Descartes's Myth." According to this doctrine,

a person has direct knowledge of the best imaginable kind of the workings of his own mind. Mental states and processes are (or are normally) conscious states and processes, and the consciousness which irradiates them can engender no illusions and leaves the door open for no doubts. A person's present thinkings, feelings and willings, his perceivings, remembrings and imaginings are intrinsically "phosphorescent"; their existence and their nature are inevitably betrayed to their owner. (Ryle 1949: 15)

To say that a person has knowledge of the best imaginable kind of the workings of his own mind is, among other things, to say that his introspectively based beliefs about his own mental states and processes can't be mistaken. In other words, such beliefs are infallible. This is one dimension of the doctrine of privileged access. A different dimension is at issue in the suggestion that one's own mental states and processes are "phosphorescent." To rule out the possibility of ignorance with regard to the nature and existence of one's mental states and processes is to regard such states and processes as inherently self-intimating. What this means is that it isn't possible for a proposition ascribing current mental states or processes to oneself to be true without one's knowing that it is true.

How does the doctrine of privileged access relate to Cartesian dualism? On the one hand, one might think that conceiving of the mind as an immaterial spiritual substance does not commit one to regarding its activities as perfectly transparent to itself in the way that the doctrine of privileged access implies. On the other hand, some materialists have argued this doctrine is incompatible with their conception of the nature of mind. For example, Armstrong defends a version of central-state materialism according to which mental processes are states of the person apt for the production of certain sorts of behavior. Yet knowledge of causes cannot be infallible or, as Armstrong puts it, "incorrigible." Accordingly, "it is essential . . . for the defender of Central-state Materialism to show that there can be no logically indubitable knowledge of, or logically privileged access to, or self-intimation by, our current mental states" (Armstrong 1968: 103). If it turns out that those states of a person that are apt for the production of certain sorts of behavior are in fact physical states of the brain, then introspection will have to be a physical process in the brain.

This explains why some materialists have been opposed to the doctrine of privileged access, but it does not explain what is wrong with this doctrine. Objections to infallibility and self-intimation can be more or less radical. Less radical critics of the doctrine of privileged access concede that this doctrine might apply to a restricted class of mental events, namely sensations. So, for example, Boghossian remarks that "it seems not conceivable, in respect of facts about pain, that we should be either ignorant of their existence or mistaken about their character, just as the Cartesian doctrine requires" (Boghossian 1998: 151). On this account it is in respect of thoughts and emotions that Descartes goes wrong. We can be both mistaken and ignorant about our own thoughts and emotions, so only a restricted version of the doctrine of privileged access has any

chance of being acceptable. In contrast, radical critics of this doctrine maintain that it isn't even true of sensations like pain. One can be in pain without realizing it and one can think that one is in pain when one isn't.

In these terms, Armstrong is an example of a radical critic of privileged access. He gives the example of someone whose legs begin to ache during a long walk but who ceases to be aware of the aching as a result of his being engaged in a lively conversation. The natural thing to say about this case is that the ache, which is a kind of sensation, continued throughout the conversation even when the person was unaware of it. It remains true that he could have made himself aware of it by suitably directing his introspective attention, but there is still a sense in which sensations can fail to be self-intimating. In addition, it is arguable that there are other current mental phenomena "of which we are not aware, and of which we cannot make ourselves aware merely by the redirection of attention" (Armstrong 1984: 125). One such phenomenon is subliminal perception, "perception which occurs without the perceiver being aware of it, or being able to make himself aware of it" (Armstrong 1984: 132).

The thesis that thoughts and emotions can fail to be self-intimating is much less controversial than the thesis that sensory phenomena can fail to be self-intimating. Both more and less radical critics of the doctrine of privileged access tend to refer to Freud in this connection. Freud is taken to have shown that the unconscious is a "really existing thing, exerting causal power" (Armstrong 1984: 131) despite being anything but phosphorescent. If, for example, I can desire something without realizing that I desire it then desire is one mental phenomenon which can fail to be self-intimating. Yet such examples leave it open that the mental is *normally* self-intimating and that unconscious mental phenomena can in principle be brought to consciousness. This suggests that those who think that the mental is self-intimating have some room for maneuver even if Freud's account of the unconscious is accepted.

With regard to alleged infallibility of introspectively based judgments about the contents of one's own mind, radical critics of the doctrine of privileged access deny that any such judgments are absolutely immune to error. Less radical critics allow that there is some introspective infallibility but insist that the scope of such infallibility has been exaggerated in the Cartesian tradition. In defense of the more radical position it might be claimed that "one may be mistaken about one's own thoughts" (Davidson 1994: 43) and that even introspectively based judgments about one's own sensations can be mistaken. One can think that one is in pain and yet not be in pain. In defense of the less radical position it might be questioned whether mistakes about one's own sensations are really intelligible. In addition, strict *cogito* judgments appear to be immune to error even if it is not true in general that judgments about one's own propositional attitudes can't be mistaken. As Burge points out, the thought that I am now thinking is both self-referential and self-verifying. In such cases, "an error based on a gap between one's thoughts and the subject-matter is simply not possible" (Burge 1994: 74).

In the light of the infallibility of *cogito* judgments, a blanket rejection of the doctrine of privileged access does not seem warranted. The interesting question is not whether there is such a thing as introspective infallibility but how far such infallibility extends. If only self-verifying judgments are infallible then the fact that few introspectively based judgments about one's own thoughts and sensations are genuinely self-verifying implies that introspective infallibility is not a widespread phenomenon. Yet self-

knowledge enjoys other epistemic privileges that are no less interesting. In the first place, one might think that there is an "overriding presumption that a person knows what he or she believes" (Davidson 1994: 43) and that the possibility that one may be mistaken about one's own thoughts does not defeat this presumption. Secondly, there is the idea that errors about what one thinks or believes cannot be what Burge calls "brute errors." Brute errors do not result from any carelessness, malfunction, or irrationality; they do not indicate something wrong with the thinker. In these terms, ordinary perceptual judgments can be brutally mistaken, but brute mistakes are impossible when it comes to judgments about one's own thoughts. Finally, judgments about one's own thoughts are direct, in the sense that the knowledge in which they normally issue is not the product of ordinary empirical investigation.

There is much more to be said about each of these epistemic privileges, but the important point for present purposes is that they are all privileges that can be enjoyed by judgments that are not strictly infallible. So even if one is skeptical about the idea that self-knowledge is infallible one can think that it is epistemically privileged. How does this bear on Descartes's own position? Although Descartes is often represented as having insisted that self-knowledge is both infallible and exhaustive, there is some evidence which points in a different direction. It has been pointed out, for example, that Descartes's thesis that the mind is better known than the body is what Newman calls a "comparative" rather than a "superlative" thesis and that Descartes regards introspective judgments about one's own sensations as subject to error. There is also evidence in Descartes's writings of a degree of skepticism about the idea that the mental is necessarily self-intimating (see, for example, 1:122; AT 6:23; 2:21; AT 7:31; 3:203; AT 3:478). So if a "Cartesian" conception of self-knowledge is committed to infallibility and self-intimation then it is at least open to question whether Descartes himself was a Cartesian. But we have seen that one can fail to be a "Cartesian" without going to the opposite extreme of holding that self-knowledge is fundamentally no different from knowledge of the external world. Self-knowledge can be authoritative without being infallible.

If we can know what we are thinking without any empirical investigation, how can it nevertheless be true that our thoughts depend for their identities on our relations to the environment? This is a question about the relationship between anti-individualism and the directness or authority of self-knowledge. So-called "incompatibilists" (Ludlow and Martin 1998) hold that it draws attention to a genuine problem. If I can't know what the environment is like without any empirical investigation, and my thoughts are individuated non-individualistically, then I can't know what I am thinking without any empirical investigation. Since I do know what I am thinking without any empirical investigation it follows that anti-individualism is false. In contrast, compatibilists hold that it can be true both that knowledge of one's own thoughts is direct and authoritative and that some of one's thoughts depend on relations that one bears to one's physical and social environment. Even if knowledge of one's environment must be empirical, it doesn't follow that knowledge of one's non-individualistically individuated thoughts must be empirical.

The debate between compatibilism and incompatibilism is still very much alive. If there is anything to the suggestion that Descartes flirted with anti-individualism then it is essential for his purposes that compatibilism is correct. If, on the other hand,

incompatibilism is correct, then this strengthens the case for reading Descartes as an individualist. Either way, contemporary discussions of these and many other central issues in the philosophy of mind begin with Descartes. Rightly or wrongly, dualism, individualism, and the doctrine of privileged access are all seen as different aspects of Descartes's philosophy of mind, and the extent to which the philosophy of mind has been shaped by Descartes can be seen in the extent to which responses to these doctrines are seen as responses to Descartes. While few philosophers of mind nowadays would be happy to be described as "Cartesian," and many are explicitly concerned to combat what they see as the errors of "Cartesianism," it is difficult to imagine what the philosophy of mind would look like without Descartes's contribution.

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Chapter 29

Descartes and the Phenomenological Tradition

WAYNE M. MARTIN

The specter of Descartes figured as a perpetual presence in much of twentieth-century philosophy, but nearly always as an emblem for positions to be avoided. Cartesian foundationalism in epistemology, the ontological dualism of mind and body, the associated conception of the mind as a substance, and as a “thing that thinks” – all these have figured in recent philosophy as positions to be refuted or simply renounced, the *absurda* in one or another *reductio* argument. But for one prominent twentieth-century tradition the story is much more nuanced and complex. Twentieth-century phenomenology, which began to stir as a well-defined movement in the last decade of the nineteenth century and has persisted in one form or another into the twenty-first, found in Descartes much more a *causa belli* than the usual *bête noire*. As a first approximation we can say that allegiance to Cartesianism divided the phenomenological tradition. Edmund Husserl, who along with Franz Brentano is usually acknowledged as the founder of the phenomenological movement, described Descartes as “the genuine patriarch of phenomenology”; he dubbed his own transcendental phenomenology as “a new, twentieth century Cartesianism,” and insisted that “the only fruitful renaissance is the one which reawakens [Descartes’s] *Meditations*” (Husserl 1964: 3, 5). But Husserl’s most important assistant, Martin Heidegger, rebelled against the Cartesian legacy in modern philosophy, which he saw as the central wrong-turn in modern thought, and as the chief obstacle to a faithful phenomenology and phenomenologically informed ontology. The *cogito sum*, Heidegger insisted, must be “phenomenologically destroyed” (Heidegger 1962: 123). In Descartes himself Heidegger found “an extreme counterexample” (Heidegger 1985: 172) and a useful stand-in for his patricidal attacks on Husserl. As we shall see, however, this first approximation must not only be filled out, it must also be qualified and corrected. For as we shall find, Heidegger’s assault on Cartesianism remains in important respects continuous with Husserl’s complex appropriation of it. And Husserlian “neo-Cartesianism,” it turns out, finds itself obliged “to reject nearly all the well-known content of the Cartesian philosophy” (Husserl 1950: 1). Moreover, despite all Heidegger’s hostility toward Descartes and the “Cartesian subject,” he retains at least one fundamental strategy of Cartesian thinking.

Before turning to details, however, we should begin with some kind of clarification of the notion of phenomenology itself. Unfortunately, this is a matter which presents

some notorious difficulties. Everything about phenomenology – not only its results and methods but its fundamental aims and prospects – has been contested, both within the tradition and outside it. One common characterization casts phenomenology as the philosophical study of the structures of subjective experience, or simply as the study of consciousness. Phenomenology, on this construal, is an attempt to investigate how things appear to us in our conscious experience; it studies the subjective “seeming” of things as opposed to their objective being. It is the study of “what it is like” to be conscious or aware. But all these characterizations of phenomenology are heavily weighted toward the Husserlian side of the tradition. Heidegger and Heideggerians contest all the concepts we have just employed: consciousness, experience, subjectivity. And indeed part of their complaint is that these concepts are tainted with Cartesian preconceptions. In *Being and Time*, Heidegger preferred to trace the notion of phenomenology back to its ancient etymological roots: *ta phainomena* (deriving ultimately from the Greek word for light: *phos*) and *logos* (discourse, speech, or reason). He then defines phenomenology primarily as a method: “to let that which shows itself be seen from itself in the very way in which it shows itself from itself” (Heidegger 1962: 58).

If we look for the common denominator among these formulations we might characterize phenomenology as the study of the ways in which things “come to light” or “show up for us” as the sorts of things that they are. When we look to the range of particular studies within the phenomenological tradition, we see that such an enterprise comes to encompass an enormous range of topics: from Husserl’s account of how a two-dimensional facade presents itself as one side of a three-dimensional solid, or how one note is experienced as part of a melody, to Heidegger’s account of the structure of the availability of tools, or the authority of others, or the prospect of our own death. In all this both Husserl and Heidegger distinguish quite sharply (though in different ways) between phenomenology and the empirical sciences, including empirical psychology. Where the sciences are concerned to identify and explain the objective natures, motions, and mechanisms of things (including human bodies), phenomenology can perhaps better be seen as a branch of semantic theory: a study of structures of meaning, although in this case not meaning in language but meaning in conscious experience (Husserl) or in intelligible encounters with things (Heidegger).

Husserl’s Cartesianism

Although he discussed Descartes in nearly all the published works of his mature period, in many of his university lectures, and in his *Nachlaß* notes, the main texts pertaining to Husserl’s Cartesianism are certainly those associated with his celebrated visit to Paris in the winter of 1929. The occasion of the visit was an invitation from the Académie Française to deliver a pair of lectures on the new phenomenology. The event was something of a grand occasion, and a testament to Husserl’s growing international reputation at the time. The lectures were delivered at the Sorbonne in the Amphithéâtre Descartes; the German Ambassador attended, as did a very young Emmanuel Levinas, who would become a leading figure among a later generation of phenomenologists, as well as an important commentator on Husserl’s thought. In retrospect the episode can be seen as an important point of influence of the German philosophical tradition upon

the French; as regards the philosophical content of the lectures, however, the direction of influence certainly ran in the other direction. The lectures were advertised under the title "Introduction to Transcendental Phenomenology" and were delivered in German. On his way back to Freiburg from Paris, Husserl prepared an expanded version of the text to be translated for publication in French. The translation was undertaken by Levinas (with assistance from Gabrielle Peiffer) and finally appeared in France in 1931, now bearing the title *Méditations cartésiennes*. The new title was entirely fitting, as the lectures (both as delivered and as published) were constructed as an elaborate interweaving of Husserl's own thought and the *Meditations* of Descartes. It is worth noting that this most elaborate and effusive acknowledgment of Descartes came two years after the publication of *Being and Time*, and may well have been occasioned in part by Heidegger's anti-Cartesian diatribe. The lines of influence and rivalry between Husserl and Heidegger seem to have run in both directions.

How can we best characterize the Cartesianism of Husserl's *Cartesian Meditations*? One recent scholar has argued that Husserl took only a single idea from Descartes, and that this idea he profoundly altered: "In fact the *cogito* is the *only* thing in Descartes that is, according to Husserl, of any philosophical significance at all (Smith 2003: 12–13)." But while it cannot be denied that Husserl profoundly reshaped the Cartesian legacy he claimed, we should also recognize that his complex borrowing from Descartes extends well beyond his provocative appropriation of the Cartesian *cogito*. The whole text of the Paris lectures followed a Cartesian form, cast in the first person as a set of meditations – an effect which was magnified in the published edition of the text. The arc of lectures followed the path Descartes had established: from an act of epistemic suspension, through the discovery of the subject, through to a kind of rational rediscovery of an altered world. As Husserl himself puts it, he proceeds "in true Cartesian fashion, [as] philosophers meditating in a radical sense, with, of course, frequent and critical modifications of the older Cartesian meditations" (Husserl 1964: 5). We shall return in due course to consider Husserl's "frequent and critical modifications"; but first we shall review the Cartesian themes and tropes that make their appearance in the text that follows. It will be useful to distinguish six points.

1 *Radical philosophy and the crisis of science*

Perhaps the deepest affinity between Husserl and Descartes lies in their common diagnosis of the state of affairs in the contemporary sciences of their respective times. It is well known that Descartes held that the sciences of his day were in disarray, with much of what passed for scientific knowledge in need of thoroughgoing criticism and repudiation. And it was of course in part this assessment that motivated his call for a radical and far-reaching philosophical response. The existing sciences should be cleared away, with a new and rigorously scientific philosophical inquiry preparing the way for a new and more secure scientific regime. These are radical aims, both in the stance they adopt toward the past and in the role they envision for philosophy in preparing the way forward.

Few in the twentieth century would endorse such immodest aims for philosophy, but Husserl explicitly followed Descartes on this point and shared his outlook. Although the idea of a "Crisis of the European Sciences" became Husserl's guiding theme mainly

in his final published work (Husserl 1970), it had long been his conviction that twentieth-century natural science suffered a critical unclarity at its foundations – an unclarity which was increasingly manifest in the *fin-de-siècle* crises regarding the foundations of logic, mathematics, and mathematical physics. But Husserl also perceived a broader crisis of scientific rationality in modern European culture, a crisis of confidence in the ability of rational philosophy and mathematical science to deliver upon its ancient promises (see, for example, Husserl 1965; cf. Weber 2004). In all this Husserl found a deep affinity with Descartes's distinctive combination of pessimism and optimism: pessimism about the current state of science, optimism about the unlimited prospects for a reformed science and about the role of philosophy in bringing about that brighter future. But such gains could be achieved, for both thinkers, only by way of a genuinely radical new beginning in philosophy, and it was above all this spirit of radical ambition that Husserl's *Cartesian Meditations* sought to appropriate for a new era.

2 *A foundational philosophy of the subject*

But it was not simply in his radical aims that Husserl found an affinity with Descartes; he also shared a fundamental conviction about how such aims were to be attained. If science were to be put on a secure footing, Descartes held, it must begin with a turn toward the subject. On this point Husserl was in fundamental agreement, although he would fiercely dispute Descartes's understanding of what such a turn – or indeed such a subject – would amount to. Nonetheless a crucial part of what Husserl sought to appropriate from Descartes was the conviction that a secure foundation for science and the proper scope for a foundational philosophy was to be found not in God or in Being or in Logic but first and foremost in an investigation of the inquiring subject himself. And in contrast to the anti-foundationalist tenor of later twentieth-century epistemology, Husserl followed Descartes in holding that such an investigation – and *only* such an investigation – could provide the requisite epistemic foundations upon which a claim to scientific knowledge could be mounted and defended.

The philosopher's quest is for truly scientific knowledge, knowledge for which he can assume . . . complete responsibility by using *his* own absolutely self-evident justifications. I can become a genuine philosopher only by freely choosing to focus my life on this goal. Once I am thus committed and have accordingly chosen to begin with total poverty and destruction, my first problem is to discover an absolutely secure starting point and rules of procedure, when, in actual fact, I lack any support from the existing disciplines. (Husserl 1964: 4)

These words are Husserl's, speaking at the Sorbonne in 1929, but the thought and the ambitions are unmistakably Cartesian.

3 *Methods of doubt*

So how are such grand ambitions to be attained? Where and how is the meditating philosopher to discover this secure starting point? Here again Husserl follows a Cartesian

lead. The central philosophical tool of Descartes's *Meditations* becomes the central device of Husserl's mature phenomenological method: "We can now let the universal epoché in the sharply defined and novel sense we have given to it step into the place of the Cartesian attempt at universal doubt" (Husserl 1931: §32). For Descartes in the *Meditations*, the strategy for a radical new beginning in philosophy lies in the method of radical doubt. If much of what I have trusted as true has shown itself to be false, I will now set aside as false anything which admits of the least doubt. In the progressive implementation of this resolution over the course of his First Meditation, Descartes comes to doubt the testimony of his senses, the existence of the world, even the simplest mathematical truths. The world, we might say, is at this point lost – not because it no longer exists, but because the meditating philosopher can make no use of his convictions regarding it. He must find a way forward without relying on them. For Descartes, of course, that way forward is found in the *cogito*: in the indubitable conviction of the meditator's own existence, and with that existence the domain of thoughts or representations which, though they may be doubted as accurate representations of a mind-independent world, have an indubitable presence as the contents of the doubter's mind.

In this method and in this discovery of subjectivity, Husserl found Descartes's greatest achievement, and the prototype for his own phenomenological procedures. Already in the writings of the 'teens, Husserl had introduced the idea of a phenomenological reduction or "epoché." As phenomenologists, our interest lies in the presentation of the world in our conscious experience. Prior to the question as to whether our thoughts are true or false there is the question of how our experience manages to bear truth-evaluable content at all. For Husserl, the investigation of this question requires that we very deliberately refocus our attention. In both everyday life and in empirical science our outlook is naïve. We simply take it for granted that our experience presents us with an independent world; our concerns lie in one or another form of trafficking with that world. The distinctive tasks of phenomenological inquiry, however, call for a suspension of this "natural attitude" or "natural naïveté." If we want to know *how* conscious experience presents us with a world then we must turn our attention to that experience itself, in order to study the structures which sustain the natural attitude. (On the naïveté of the natural attitude, see Husserl 1965: 87.)

In such an endeavor, Husserl holds, we can closely approximate the methodology of Descartes's *Meditations*. Just as Descartes suspended his usual beliefs in seeking secure epistemic foundations, so Husserl calls for the phenomenological inquirer to "place his beliefs in brackets," to "abstain" from one's convictions, to put all beliefs and theories about the world "out of play" (e.g., Husserl 1931: §31; 1950: 20). Once he has done so his situation will be much like that of Descartes in his Second Meditation: he will no longer invoke his customary views about the objective world, whether in the form of everyday commonsense convictions or elaborate scientific theories. All such convictions are out of bounds for the meditator, whether Cartesian or Husserlian. And what will come into view at that point is something that, according to both thinkers, is always present but not usually thematized: the thinking I and its domain of meaningful contents. The world is bracketed not simply to insure against error, but to bring into view that domain of consciousness which, according to both, must ultimately serve as the epistemic foundation for all our worldly beliefs.

Here, however, we must mark two crucial differences between the Cartesian prototype and its Husserlian variant; the first pertains to the inner workings of this epistemic suspension, the second to its application in pursuit of philosophical results. In Descartes's *Meditations* we find two canonical formulations of what we might call the skeptic's resolution or the maxim of the doubter. In his First Meditation, Descartes resolves as follows: "So in future I must withhold my assent from these former beliefs just as carefully as I would from obvious falsehoods, if I want to discover any certainty" (2:15; AT 7:21–2). At the beginning of the Second Meditation the maxim of doubt is cast in these terms: "Anything which admits of the slightest doubt I will set aside just as if I had found it to be wholly false; and I will proceed in this way until I recognize something certain" (2:16; AT 7:24). In both formulations of the doubter's maxim we find a common juxtaposition: between "setting a belief aside" and "finding a belief to be false."

I shall not here undertake an interpretation of this juxtaposition as it figures in Descartes's argument (for a subtle discussion, see Broughton 2002). What is crucial for our purposes is to appreciate that for Husserl these two epistemic stances must be sharply distinguished. A first point here is fairly straightforward, and is one that Descartes himself surely appreciated: to treat a belief as plainly false is, *pro tanto*, to treat its negation as true. Accordingly, if one really seeks to put one's convictions out of play altogether, then one cannot set them aside in quite the same way as one sets aside a false belief.

But there is a further point to recognize here. For Husserl, unlike Descartes, the chief aim of this act of epistemic suspension is to investigate the phenomenon of believing itself. Husserl wants to know, so to speak, *what it is like* to have a belief, what the experience of believing (and other intentional states) amounts to. Hence whatever is involved in applying the *Husserlian* variant on method of doubt, it must not make the act of belief go away altogether; that would be to lose the very thing one seeks to investigate. This is exactly what Husserl means when he talks of "putting my beliefs in brackets." The phenomenological meditator seeks to leave his beliefs there, but to put them out of play for the purposes of phenomenological investigation. Husserl himself emphasized the difficulty of this distinctive form of mental contortion, and most of his successors ultimately came to the conclusion that it was impossible. (Several of the surviving photographs of Husserl seem to show him, pen in hand, struggling to carry it off.) What matters here, however, is to appreciate how this subtle difference between the workings of Husserlian epoché and that of Cartesian doubt reflects a deeper underlying divergence in philosophical ambition, despite the many affinities we have emphasized. For Descartes, the point of the method of doubt is to discover some indubitable fact which can then serve as a premise of sorts for securing further knowledge about an extra-mental reality. For Husserl, the point of the epoché is to bring into view the contents and acts of consciousness in order to uncover and investigate their distinctive character.

4 *The cogito and ego*

So what is brought into view under the distinctive conditions of meditation recommended by Descartes and Husserl, respectively? For Descartes, it is first and foremost

the meditator's indubitable existence and the immediate contents of his mind. This foundational point in Cartesian philosophy receives a novel formulation in the language of Husserlian phenomenology:

[T]his 'phenomenological epoché' and 'parenthesizing' of the Objective world therefore does not leave us confronting nothing. On the contrary we gain possession of something by it; and what we (or, to speak more precisely, what I, the one who is meditating) acquire by it is my pure living, with all the pure subjective processes making this up, and everything meant in them, *purely as* meant in them: the universe of 'phenomena' in the . . . phenomenological sense. The epoché can also be said to be the radical and universal method by which I apprehend myself purely: as Ego, and with my own pure conscious life. (Husserl 1950: 20–1)

For Husserl, then, the phenomenological epoché serves to bring into view phenomena, the objects of investigation in phenomenology. And like Descartes, Husserl holds that with the discovery of these phenomena comes a distinctive form of pure self-discovery. This purity can itself be understood in Cartesian terms. What I discover here is certainly not the existence of myself as a human body in space; for both Descartes and for Husserl any convictions about my body have been "set aside." Rather, I discover myself as what Husserl calls "the transcendental ego," as the subject and agent of my experience. We shall return below to consider the sense of the term "transcendental" in this context, and to the fundamental divergence from Descartes that Husserl seeks to mark by that term. But for now we can emphasize the deep symmetry between the course of these two sets of meditations. Indeed, on exactly this point Husserl may well have been directly influenced by his study of Descartes. Up until 1901, Husserl had insisted that there was no self to be discovered in experience; but starting with his lectures on Descartes in 1923–4 he came to describe his phenomenological project as an "egology" (see Husserl 1956).

5 *Clear and distinct ideas*

In the further elaboration of Descartes's epistemological project, a crucial role is played by so-called "clear and distinct ideas." Within the *Meditations* themselves, the chief epistemic principle is that which maintains – partly on theological grounds – that "whatever I clearly and distinctly perceive is true." In Descartes's scientific practice, this effectively meant that epistemically warranted scientific claims must be framed mathematically. Husserl certainly does not follow Descartes in all these details. (The theological doctrines of the *Meditations* are almost certainly part of what Husserl has in mind when he refers to "the content of the *Meditations*, so strange to us men of today": Husserl 1950: 3.) Nonetheless he follows Descartes in seeing mathematical idealization as fundamental to modern science (this is the major theme of the first part of Husserl 1970), and more importantly, he appropriates and redeploys an account of the character and epistemic significance of clear and distinct conception.

For both Descartes and Husserl, the domain of conscious contents revealed under the distinctive conditions of epistemic suspension is to serve as the ultimate epistemic basis for all rigorous scientific knowledge. In part this is because, at the outset of

inquiry, this is simply all the evidence the meditator has to go on; in part it is because of the distinctive epistemic security of those contents. For the Cartesian this security derives from the (recently much-contested) immunity from error that pertains to claims about one's own psychological states. If I make a claim about how things are in the world I am vulnerable to error; but if I confine my claims to how things *seem to me*, or to *what I believe* about the world, then I insure against such vulnerability. For Husserl, however, the distinctive epistemic authority of our conscious content derives from the characteristic ontological structure of phenomena. At different stages of his career Husserl characterized this ontological structure in different ways, but the core idea remains the same. Unlike ordinary and extraordinary objects of experience (tables and chairs, people and institutions, quarks and black holes), which admit of a contrast between their objective nature and their subjective appearance, phenomena are exhausted by their appearance. There simply is no "being" behind the "seeming"; hence there is no danger that a phenomenon's appearance might mislead us as to its objective nature. Accordingly, if we can only manage to put ourselves in the right frame of mind such that phenomena come into view, we will find ourselves presented with a distinctive object of attention for which apodictic certainty is in principle possible. They are, as Husserl puts it, capable of being given with absolute evidence.

[W]e meditators, while completely destitute of all scientific knowledge, must have access to evidences that already bear the stamp of fitness for such a function, in that they are recognizable as preceding all other imaginable evidences. Moreover, in respect of this evidence of preceding, they must have a certain perfection, they must carry with them an absolute certainty. (Husserl 1950: 14)

To be sure, various kinds of error will still be possible in phenomenology, particularly if we allow our prejudices and preconceptions about the mind to replace stringent phenomenological observations. There will also be a host of special difficulties and dangers that present themselves when we try to find words (*logoi*) to describe our phenomena. Ordinary discourse may be well suited for the mundane business of describing things that are (beings), but it may prove quite misleading when used for the ultramundane business of phenomenological description. But while the phenomenologist cannot for these reasons claim absolute immunity from error, he can, according to Husserl, justifiably claim to have found a domain of description distinctively suited to apodictic certainty.

6 *The return of the world*

The epistemic cycle of Descartes's *Meditations* closes with the recovery of what had been lost. What in the First Meditation had been dispatched through the discipline of radical doubt is returned as an object of either actual or possible knowledge. But what is returned is also transformed. I know myself, not as a body in space but as a hybrid of a thinking mind and an extended body; I know God, not as a figure from a revealed religion, but under the rational characteristics of first cause and most perfect being. And I know the material world, not as so many objects of a sensory show, but as *res extensa*, cognizable by a geometrical physics.

In Husserl too the world is returned and transformed. But there is a crucial difference. For the purposes of phenomenological inquiry, the recovery of the world is not so much recovery of knowledge about the world as it is reconstruction of the principles under which a knowable world is available for us as an object of experience. Unlike Descartes, Husserl is not aiming to establish specific knowledge claims about an objective, mind-independent world. In this sense, the epoché remains in effect right through to the end of Husserl's inquiries: *qua* phenomenologist, he remains agnostic about the objective traits of worldly entities. What he seeks to recover is the world *as an object of experience*. That is, he seeks to exhibit how it is that, starting from the immediate deliverances of conscious experience, as described under the phenomenological reduction, we come to have experience of an enduring, three-dimensional world of natural entities with objective properties. In the Paris lectures and the *Cartesian Meditations* Husserl offers only the briefest sketch of this "recovery," though in other texts it is elaborated at much greater length. Considering in turn our experience of a hexahedron, a melody, and of Others (i.e., other subjects of experience), he sets out to articulate the complex processes of anticipation and fulfillment, or "horizontal adumbration" whereby the immediately given contents of consciousness are synthesized as experiences of entities of these distinctive kinds. But the point of these phenomenological exercises is *not*, as in the Cartesian epistemological tradition, to refute the skeptic or the solipsist. Rather, Husserl aims to exhibit what we might call the "logic of consciousness": the formal structures whereby elements of conscious experience combine to represent complex objective totalities.

Already in this survey of Husserl's loans and debts we have begun to see a number of departures from his Cartesian model. But in addition to these points of divergence Husserl also offers a series of increasingly trenchant criticisms. Indeed, almost every passage celebrating Descartes's accomplishments also incorporates unmistakable indicators of this critical dimension of his appropriation. The Cartesian method of doubt promises a radical ground for philosophy, but only "if made in the right manner"; Descartes had the will to free himself radically from assumptions, but "scholasticism lies hidden, as unclarified prejudice, in [his] *Meditations*" (Husserl 1950: 18, 23–4). The criticisms become rather more systematic and explicit in the published *Meditations* than they were in the original lectures, but even for his Parisian audience, Husserl did not mask or soften his critique:

In these matters Descartes was deficient. It so happens that he stands before the greatest of all discoveries – in a sense he has already made it – yet fails to see its true significance, that of transcendental subjectivity. He does not pass through the gateway that leads into genuine transcendental philosophy. (Husserl 1964: 9)

As this last passage already indicates, Husserl's most pointed and important criticisms of Descartes pertain to his understanding of the thinking ego, the "subjectivity" that Husserl credits Descartes with having discovered. The issues here are complex and fiercely disputed; for our purposes I shall simply try to indicate the two most fundamental points. Husserl's first critical point is in effect his adaptation of a longstanding German tradition which criticizes the so-called "reification of the subject." (Related criticisms can be found in Kant, Fichte, Schopenhauer, and Dilthey, among many

others.) Having identified the I or ego as his indubitable starting point, Descartes famously goes on to characterize it as “a thing that thinks,” as *res cogitans*. Husserl complains that this is a fundamental misstep. If the method of epistemic suspension is strictly carried through, then any claims about *things* should properly be held in abeyance; the meditator should confine himself to the description of *phenomena*. But to treat the I as a *res* (and then as substance) is to treat it as something with an objective nature transcending its appearance. As Husserl sees it, Descartes mistakenly thinks he has discovered “a little tag-end of the world,” and that the remaining task is “to infer the rest of the world by rightly conducted arguments, according to principles innate in the ego” (Husserl 1950: 24). In Paris it was this point that took Husserl’s rhetoric to its most impassioned heights:

Here we have reached a dangerous point. It seems simple to understand the pure ego with its cogitations by following Descartes. And yet it is as if we were on the brink of a precipice, where the ability to step calmly and surely decides between philosophic life and philosophic death. . . . We must under no circumstances take it as self-evident that, with our apodictic and pure ego, we have salvaged a small corner of the world as the single indubitable fact about the world which can be utilized by the philosophizing ego. Unfortunately, Descartes commits this error, in the apparently insignificant yet fateful transformation of the ego to a *substantia cogitans*, . . . which then becomes the point of departure for conclusions by means of the principle of causality. In short, this is the transformation which made Descartes the father of the rather absurd transcendental realism. (Husserl 1964: 8–9; trans. alt.)

We cannot here undertake to unpack and assess the full complexities of Husserl’s allegations. But the most important point is his claim that, once the epoché has been thoroughly carried through, the ego that we discover is not an empirical ego, not even the ego of a particular individual; indeed, it is not properly speaking a part of the world at all. It is what Husserl, following Kant, calls “the transcendental ego,” the formal agency at work in experience, synthesizing phenomena to produce (or “constitute”) the experience of a particular embodied psychological subject presented with an enduring objective world. It is, we might say, *thinking*, rather than *a thing that thinks*. Or to use Husserl’s preferred formulation (and characteristic technical prose): it is “the validation-ground of all Objective validations and grounds [*Geltungsgrund aller objektiven Geltungen und Gründe*]” (Husserl 1950: 26; trans. alt.).

Husserl’s second point of criticism is closely related. Descartes, Husserl complains, has not only mistaken the ontological character of the ego he has discovered, he has also overlooked the basic formal structure of its thoughts.

[Descartes] neglected to describe the ego in the full concretion of its transcendental being and life, nor did he regard it as an unlimited work-project to be pursued systematically. [Had he pursued this project he would have discovered that] the expression *ego cogito* must be expanded by one term. Every *cogito* contains a meaning, its *cogitatum*. . . . Consciousness is always consciousness of something. . . . The guiding schema for our exposition and description is [accordingly] a three-sided concept: *ego cogito cogitatum*. (Husserl 1964: 12–14)

Here we encounter Husserl's distinctive notion of intentionality, or the intentional character of consciousness, thought, and experience. To say of some conscious state that it is intentional is to say that its identity is fixed in part by its object – that which it is consciousness *of*. A belief is always a belief *about* something, likewise desire, hope, fear, longing, etc., all have some object or state of affairs toward which they are directed. The identity of an intentional state is fixed in part by this object: my belief is the belief that it is in part in virtue of what it is a belief *about*. Brentano had famously used intentionality as the defining characteristic of mental or psychological phenomena; for Husserl, it was the central theme and puzzle of phenomenological inquiry. (On Brentano's thesis, see Brentano 1973: 88–9; for an influential modern articulation of Brentano's claim, see Chisholm 1957. On intentionality as the “first riddle” of phenomenology, see Husserl 1965: 87.)

Husserl's complaint against Descartes, then, is that he neglects or overlooks the phenomenon of intentionality. To every “I think” (*cogito*) there belongs a “something thought” (*cogitatum*), as its intrinsic accusative. Granted, Descartes distinguishes between the formal and objective reality of an idea, most famously in the Third Meditation in arguing for the existence of God. But he fails to consider what consciousness is such that it manifests this distinctive intentional structure. Had he done so he might have made the discovery that was left for the later tradition, namely that objects of experience are not simply there for the subject, but must be constructed or constituted as such.

The conceptual fixation of an intentional object-class leads, in intentional researches, as one soon recognizes, to an organization or order. In other words, transcendental subjectivity is not a chaos of intentional experiences, but it is a unity through synthesis. It is a many-leveled synthesis in which always new classes and individuals are constituted. However, every object expresses *a rule structured within transcendental subjectivity*. (Husserl 1964: 21)

It is only through the constituting agency of the transcendental ego that consciousness bears the determinate intentional content that makes it fit for truth-evaluation and hence even a possible candidate for error. And it is only as correlates of such constituting synthesis that objects are available as truth-makers for our thoughts. Descartes, Husserl complains, was a realist; but had he attended to the intentional character of the subjective consciousness he uncovered, he would have discovered the truth of transcendental idealism.

Heidegger's Ontological Critique

Already before Husserl traveled to Paris, Heidegger had developed a much more radical phenomenological critique of Cartesianism, inaugurating an engagement with Cartesian thought that extended through much of his career. (For a survey of Heidegger's writings about Descartes, see Marion 1996; for an early statement of Heidegger's critique of Descartes, see Heidegger 1985: 171–85.) For our purposes here I shall focus on the writings immediately surrounding the publication of Heidegger's

magnum opus, *Being and Time* (Heidegger 1962). In this context it is important to note that the published portion of *Being and Time* was a substantial fragment of an intended larger whole. We know from the published text that Heidegger planned to include a systematic critical engagement with Descartes as part of his projected Third Division. But the work was left uncompleted, and we are left to reconstruct the analysis from Heidegger's published outline, and from various discussions of Descartes incorporated both in the published writings and in the lecture courses. (For Heidegger's outline of Division III as it pertains to Descartes, see Heidegger 1962: 133.)

From the outset of his mature writings, Heidegger framed his phenomenological investigations in an ontological register. Ontology, as Heidegger conceives it, is the study of being – or, as he sometimes puts it, of “the meaning of being” or of “the being of entities.” Two of Heidegger's most fundamental distinctions can already be seen in play here. The first is the so-called “principle of ontological difference,” the thesis that being is not itself a being; it is not, so to speak, one more entity among the various things that are. Second, Heidegger distinguishes between two kinds of investigation or “science.” *Ontic* sciences investigate one or another kind of being or entity (biology investigates living entities, geology investigates the Earth, etc.); *ontology*, by contrast, concerns itself not with beings (or entities, *die Seienden*; literally: the things that are), but rather with the *being* of those entities, with what it is or means to be (see, for example, Heidegger 1982: 11–19). For anyone unfamiliar with Heidegger's idiosyncratic (and seductive) patterns of thought, all this will have something of the air of an incantation. But it comes to have quite a direct and indeed exemplary application in Heidegger's ontological critique of Descartes. In what follows I elicit the main outlines of Heidegger's account, focusing on three main points.

1 *The phenomenological inadequacy of subject-object ontology*

Like many of Descartes's twentieth-century critics, Heidegger attacked the dualism which figured centrally both in Descartes's metaphysical doctrines and in his philosophical legacy. But whereas others attack the dualism of mind and body, Heidegger's focus is rather on the dualism of mind and world, together with the closely related dualisms of subjective and objective, *res cogitans* and *res extensa*, and the powerful metaphorical contrast between a private, mental, “inner” realm and a public, physical, “outer” one. In short it is not the mind-body contrast *per se* that troubles Heidegger, but a conception of being: an ontological criterion according to which everything that is must be assigned to one or the other of these two ways of being.

So what is wrong with this ontological dualism? Once again here we must take care not to assimilate Heidegger's criticism too closely to those found in more traditional metaphysics and philosophy of mind. For Heidegger's complaint about Cartesian dualistic ontology is not that it creates insuperable problems over the interaction of mind and brain, nor that it relies on an extravagant metaphysics of “spiritual substance.” Indeed, Heidegger is wholly silent over these more familiar anti-Cartesian objections. Rather, his complaint is, in the first instance, that the Cartesian ontological framework is *phenomenologically* inadequate.

Here, as in many instances, Heidegger draws on a Husserlian line of argument which he then radicalizes and turns against Husserl himself. As we have already had

occasion to note, Husserl himself had made the study of intentionality central to phenomenological investigation. Here it is significant to remember that Brentano had introduced the notion of intentionality specifically as a device for distinguishing mental or psychological states from material or physical ones. That is, Brentano deployed the notion of intentionality specifically in order to mark a version of the Cartesian ontological divide. Husserl had argued, however, that the phenomenological structure of intentionality must remain mysterious so long as one confines oneself to these two familiar ontological categories. The crucial difficulty here is the problem of accommodating the intentional *object* (i.e., the object of an intentional state, that which it is “of or about”) within the constraints of Cartesian ontology.

The issues here closely mirror the debates about empty reference which figured so prominently among the founding figures of analytical philosophy of language, albeit in this case in connection with the intentional structure of *experience* rather than the referential function of *language*. Imagine a group of Conquistadors sitting around the campfire wondering where to find El Dorado. Here we have a case of intentional experience; their wonder is clearly wonder *of or about* something. But what should we say that their wonder is directed toward? What is its intentional object? If we confine ourselves to the usual ontological alternatives then we seem forced to say that it is either an “outer” physical item in the world or an “inner” psychological state in their minds. But neither option seems apt. El Dorado does not and never did exist, so it seems clear that the object of their intentional wonder is not any material “outer” object. Yet it would be a very bizarre distortion of the case to say that their wonder concerned the location of some mental item; their concern was to find the city of gold, not a mental representation of it!

This problem was to exercise the phenomenological tradition through several generations. Brentano at one point seemed to embrace (though he subsequently abandoned) the second horn of the dilemma, insisting that the object of an intentional state “in-exists” within the psychological state (Brentano 1973: 88). Husserl’s solution was to expand the usual subject-object ontology, in a strategy closely analogous to the appeal to the “third realm” in Lotze and Frege. (For an influential discussion, see Føllesdal 1969; for a critique, see Dummett 1993; for an attempt to accommodate non-referring intentional states within subject-object ontology, see Searle 1983.) But Heidegger resorted to a much more radical position. Criticizing both the “erroneous objectivizing” and the “erroneous subjectivizing” of intentionality, and ridiculing the appeal to a third realm as “no less doubtful than medieval speculation about angels” (Heidegger 1982: 65, 215), Heidegger proposes instead that the whole ontological framework of inner mind and outer world be abandoned:

Because the usual separation between a subject with its immanent sphere and an object with its transcendent sphere – because, in general, the distinction between an inner and an outer sphere is constructive and continually gives occasion for further constructions, we shall in the future no longer speak of a subject, of a subjective sphere. . . . The idea of a subject which has intentional experiences merely inside its own sphere and is not yet outside it is an absurdity which misconstrues the basic ontological structure of the being that we ourselves are. (Heidegger 1982: 64)

We shall return presently to consider Heidegger's alternative ontological analysis of "the being that we ourselves are." But it is first worth emphasizing a point upon which Heidegger himself insists. We must recognize that superseding the ontology of subject and object will require not just a change in our language but a substantial change in the patterns of our thought. The Cartesian legacy in ontology has profoundly shaped the ways in which we think about ourselves and about the world in which we find ourselves, as also our sense of the problems which we think worth pursuing within philosophy. If, to take one central example, the problematic of skepticism is framed as the problem of transcending our inner experiences in order to gain knowledge of an accordingly "external world," then giving up the ontology of mind and world will mean abandoning the problem of skepticism.

The 'scandal of philosophy' is not that this proof [that we can have knowledge of an external world] has yet to be given, but that *such proofs are expected and attempted again and again*. Such expectations, aims and demands arise from an ontologically inadequate way of starting. (Heidegger 1962: 249).

2 Descartes's neglect of ontology

Heidegger's very first claim in *Being and Time* concerns the neglect of ontology: "The question of being has today been forgotten" (Heidegger 1962: 21). And for Heidegger no single thinker more clearly exemplifies this lamentable forgetting than Descartes. At first (and perhaps second) glance this is a rather bizarre claim. After all, much of Descartes's thought seems to be focused on clarifying different modes of being and determining their essential traits. Yet at a deeper level, Heidegger argues, Descartes's attention to metaphysics betrays a neglect of ontology. He presses this objection in connection with two specific doctrines of Cartesian philosophy. The first pertains to Descartes's implicit handling of ontological problems in the *Principles of Philosophy*. We there find Descartes drawing a variety of ontological distinctions – in particular, distinctions among the varieties of substance. His most celebrated distinction is of course between mental substance as *res cogitans* and physical substance as *res extensa*. But he also there distinguishes between divine and created substance, i.e., between God and his various creatures. Given these distinctions, it is natural to ask what these different substances all share in common. For Heidegger, this is the crucial question. If the basic notion in one's ontology is the notion of substance, then the question of fundamental ontology is this: *what is it to be a substance?* Descartes's official answer is that a substance is something that exists so as to depend on no other thing for its existence. But he frankly admits that this definition cannot be applied uniformly across the distinction between divine and created substance, since all created substances depend upon divine substance for their existence. Descartes's surprising conclusion is that his basic ontological term harbors an ineliminable ambiguity:

Hence the term 'substance' does not apply univocally, as they say in the Schools, to God and to other things; that is, there is no intelligible meaning of the term which is common to God and his creatures. (1:210, AT 8:24)

For Heidegger, this concession marks Descartes's refusal of the ontological question, a refusal to get to the bottom of the meaning of "substance," and hence ultimately an evasion of fundamental ontology. "This evasion is tantamount to his failing to discuss the meaning of being which the idea of substantiality embraces" (Heidegger 1962: 126).

Descartes's failure to confront the question of being is most consequential, Heidegger claims, in the case of his treatment of what Heidegger calls "the being that we ourselves are." Descartes's most famous and fundamental philosophical result of course concerns his own existence or being (his *sum*). As Heidegger sees it, however, Descartes's focus on the distinctive epistemic authority of self-knowledge, and on the nature of the thinking which secures it, comes at the expense of sufficient attention to the distinctive *being* of the entity whose existence he asserts.

Historiologically, the aim of the existential analytic can be made plainer by considering Descartes, who is credited with providing the point of departure for modern philosophical inquiry by his discovery of the '*cogito sum*.' He investigates the '*cogitare*' of the '*ego*,' at least within certain limits. On the other hand, he leaves the '*sum*' completely undiscussed, even though it is regarded as no less primordial than the *cogito*. (Heidegger 1962: 71)

On just this crucial point, Heidegger alleges, Descartes's radical stance toward the metaphysical tradition deserts him. Failing to attend to the *sum* – to the distinctive mode of being of the ego – Descartes unthinkingly and uncritically adopts the ontological category (substance) that he had inherited from that tradition. For Heidegger, however, this very neglect points the way toward an "existential analytic," the central positive project in *Being and Time*. Let us grant the Cartesian result: I am, I exist. So what exactly does it mean for something like me to be?

3 A phenomenologically informed alternative

It falls well beyond the scope of these remarks to enter into an analysis of Heidegger's ontological alternative to Cartesianism. But we are at least in a position to sketch a few of Heidegger's decisive steps, particularly as they emerge out of his repudiation of Cartesian ontology and the Husserlian phenomenological approach which, he claims, failed to supersede it. The first point here concerns the mode of being of "the kind of being that we ourselves are." In place of the Cartesian conception of a thinking substance, or a hybrid of thinking mind and extended body, Heidegger proposes his account of *Dasein*, whose mode of being he dubs simply "existence" or "being-in-the-world." These are all complex technical terms in Heideggerian phenomenology; the crucial point here is the way Heidegger deploys them in pursuit of the undertaking that Descartes neglected. If we seek a phenomenologically grounded account of our own distinctive mode of being, one which genuinely answers to the way in which we show up for ourselves as the kind of beings that we are, then we will find ourselves not as "thinking things" contemplating a world from which we are in truth detached, but rather as active beings, engaged with entities we encounter proximally around us in a world we share with them. These entities in turn we do not encounter as substances – self-contained and self-sufficient bearers of objective-properties – but as what

Heidegger calls “beings-ready-to-hand,” entities whose character and salient features manifest themselves only in their relations to other entities, and ultimately to the broader teleological context in which they figure. The locus of intentionality will no longer be found in conscious states, as Brentano and Husserl assumed, but in what Heidegger calls “comportment” – in the ways in which we skillfully and comprehendingly use things, “holding ourselves toward them.” All this in turn presupposes the sort of context in which such entities can make their appearance – what Heidegger calls simply “world.” The world, phenomenologically understood, is not a totality of entities or abstract forces, nor is it to be understood as the geometrical space in which decontextualized entities have their location. Rather, it is the systematic temporal structure of meaningful contexts in which we enjoy our distinctive mode of being, existing alongside entities and among others, anxiously projected into an approaching future which includes our own inevitable death. (For an influential accounting of these Heideggerian themes, see Dreyfus 1991.)

In all this we have come a long way from Descartes’s conception of the thinking I, as also from Husserl’s account of the pure transcendental ego. But at the same time we can still recognize the continued authority of one fundamental Cartesian conviction: any adequate philosophy, for Heidegger and Husserl as much as for Descartes himself, must find its orientation and ground in a sustained philosophical self-interrogation.

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Chapter 30

Our Debt to Descartes

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The philosophical, mathematical, and scientific legacy of Descartes is by now so deep and so pervasive in our culture that its full extent can no longer be measured with certainty or precision. I make no attempt to do so here. Nor do I try to trace the historical stages of acceptance, absorption, misunderstanding, and transformation by which it has all come down to us. But I want to draw attention to several large ideas or lines of thought that are unmistakably Cartesian in character and probably in origin which seem to me of great interest and importance. They have remained conspicuously at or near the center of philosophy for at least the last one hundred years or so. Their influence was perhaps stronger during that period than in the one hundred or so years before that.

Descartes's philosophy is distinctive in one way in starting from the idea of a secure method of "rightly conducting one's reason and seeking the truth in the sciences" (1:111; AT 6:1). That was a perfectly reasonable goal, since Descartes was in fact seeking the truth in the sciences – or anywhere else it could be found – and he wanted to be sure when he had found it and when he had not. He recognized no sharp distinction between philosophy and other ways of seeking the truth about the world; successful inquiry in any of its forms was his goal. But he thought validation or legitimation of one's apparent results was needed for real progress. Whatever was acquired by a demonstrably secure method would be guaranteed to be true and so could be relied on in future work.

Another distinctive feature of Descartes's philosophy is his particular way of pursuing this question of method. He found that it was not enough to study "the great book of the world" as he had done, and acquire a complicated body of information as to what is so (1:115; AT 6:9). All those beliefs and convictions would themselves stand in need of explicit justification as to their origin or legitimacy. To this end he resolved to undertake studies within himself, "to converse with myself about my own thoughts," and "to reform my own thoughts and construct them upon a foundation which is all my own" (1:116, 118; AT 6:11, 15). This was to be the source and basis of all the knowledge Descartes could eventually call his own. "I found myself as it were forced to become my own guide," he tells us (1:119; AT 6:16).

The reflections he recounts are not meant to be only of biographical interest. Descartes presents himself (or somebody) not simply as a certain Frenchman who has

certain thoughts about himself at a certain time, but, in Bernard Williams's words, "as an example – though a genuinely existing, particular example – of the mind being rationally directed to the systematic discovery of truth" (Williams 1978: 19). "The *Meditations* are not a description but an enactment of philosophical thought, following . . . the fundamental route by which human thought should move from everyday experience to greater philosophical insight" (Williams 1978: 20). The "guide" Descartes was forced to follow was to be something each of us can discover and follow for ourselves.

A large philosophical project with these two features – the goal of validating or legitimating what we take to be our knowledge of the world, and each person's securing the validation for himself, in the first-person singular – was at the center of philosophy for most of the twentieth century, at least in English-speaking lands. By then philosophy, following Kant, had come to understand itself as something distinct from, but somehow still related to, straightforward investigation of "the great book of the world." It was to pursue a more detached and more critical and so uniquely philosophical task. The project of justifying or legitimating what we take to be our knowledge, or at least exhibiting a possible justification of it, was the goal of what came to be known as "epistemology." As the project was conceived in its purest, classical form, it was a question of showing how each person, proceeding on his own from what is available to him in sense experience, can be justified in believing everything we all take to be part of human knowledge of the world. In the casual, offhand way philosophers seem to have with nomenclature, it even came to be called "Cartesian epistemology."

There are ideas at the heart of this project that are ideas to be found in Descartes. To that extent they are part of Descartes's legacy. That is not to say that the use to which those ideas have been put, and the consequences to which they were taken to lead, follow from or can reasonably be derived from Descartes's own understanding of them.

In his attempt to "reform" and "construct" his thoughts on a secure "foundation," Descartes in his *Meditations* resolved to withhold his assent from anything in which he finds "at least some reason for doubt" and which therefore is not "completely certain and indubitable" (2:12; AT 7:18). The first step in his application of this method was the denigration or apparent dismissal of "the senses" as a source of knowledge of the physical world. There was nothing new in itself in drawing attention to familiar perceptual illusions or delusions. But Descartes's imaginative application of his general method of doubt to all knowledge gained through the senses led to something completely new. He exposed what came to be seen as a problem or challenge to human knowledge that had never even been recognized, let alone squarely faced or answered, in philosophy up to that time.

This is what is called the "problem of our knowledge of the external world," or simply the "problem of the external world." And its emergence – even the meanings of the very terms in which it is expressed – can certainly be attributed to the novel kind of reflection Descartes engaged in in the First Meditation. His way of introducing the possibility of dreaming as a reason to doubt the deliverances of sense-experience on any particular occasion opened the door to an apparently much more devastating and completely general possibility that would seem to threaten the prospect of any perceptual

knowledge of the world around us at all. (For a highly illuminating account of what is new in Descartes and completely unanticipated in antiquity, and what thereby gives rise to the modern problem of the external world, see Burnyeat 1982.)

If, as Descartes found, “there are never any sure signs by which” a particular sense-experience can be recognized as a perception of how things actually are rather than part of a dream (2:13; AT 7:19), there is nothing to be found in any particular experience itself that enables the perceiver to distinguish the two. Descartes’s method of withholding judgment on any matter “which admits of the slightest doubt” (2:16; AT 7:24) would therefore require at least provisionally withholding judgment from the proposition that things actually are as one’s particular sense-experience presents them as being. Even though one has the experience, one *could* still be wrong in believing that that is how things are. That same method applied with complete generality demands withholding the corresponding judgment with respect to *every* sense-experience. This is the general possibility of error that Descartes illustrates with the fiction of the evil demon. And it is the acknowledgment of this general possibility that gives rise to the problem of the external world.

A powerful demon whose sole aim is to deceive everyone on every matter on which they could possibly be fooled could produce sense-experiences that would seem to indicate to perceivers how things are beyond them but would lead them astray if accepted as having that significance. Any step beyond what was strictly speaking perceived would be false. This does not mean that such perceivers could know nothing. What would remain immune to perceptual error under those circumstances would be the distinctive character of the person’s sense-experience of the moment. There would have to be something of that kind that a sufficiently careful perceiver could not be wrong about, since what he receives in perception is what serves as the stimulus or basis of any mistaken beliefs he falls into. To operate through sense-perception, a deceiver must actually give his victims something in perception that can then lead them astray. To find that kernel in one’s experience, and to withhold judgment about everything that goes beyond it, would be to restrict oneself to the deliverances of sense-experience alone. That would leave one safe from the scheming of even the most powerful would-be deceiver.

This conception of what perception alone at its best can give us finds later expression in Berkeley’s idea that “the senses perceive nothing which they do not perceive immediately: for they make no inferences” (Berkeley 1949: 174–5). Hume for the same reason thought it was not “conceivable” that the impressions of our senses, considered on their own, could deceive us. “For since all actions and sensations of the mind are known to us by consciousness, they must necessarily appear in every particular what they are, and be what they appear.” To suppose otherwise would be “to suppose, that even where we are most intimately conscious, we might be mistaken” (Hume 1958: 190; 1.4.2). The impossibility of purely perceptual error is also at work in H. H. Price’s well-known confrontation with a tomato:

When I see a tomato there is much that I can doubt. I can doubt whether it is a tomato that I am seeing, and not a cleverly painted piece of wax. I can doubt whether there is any material thing there at all. . . . One thing however I cannot doubt: that there exists a red patch of a round and somewhat bulgy shape, standing out from a background of other

colour-patches, and having a certain visual depth, and that this whole field of colour is directly present to my consciousness. . . . [By this] I mean that my consciousness of it is not reached by inference, nor by any other intellectual process . . . nor by any passage from sign to significate. (Price 1932: 3)

C. I. Lewis thought such a directly presented element can be identified in any current sense-experience by applying the following test:

Subtract, in what we say that we see, or hear, or otherwise learn from direct experience, *all that conceivably could be mistaken*; the remainder is the given content of the experience inducing this belief. (Lewis 1946: 182–3)

The implication in each case is that what one strictly speaking perceives in a given experience is only that about which one could not conceivably be wrong, given that experience. In invoking this idea these later philosophers all remain fully in line with Descartes's own application of his general method of doubt to the senses.

This idea of the restricted range of what the senses alone at best can give us, when conjoined with the assumption that the world can be known at all only somehow on the basis of what we receive through the senses, is the source of the special epistemological problem of the external world. It is a completely general problem, and it brings the whole "external" world into doubt. If the evil demon possibility were realized, all links between what is perceived and what is otherwise so in the world would have been broken. To know on the basis of sense-experience that that possibility is not in fact realized, and that one is perceiving things as they actually are, would require having some sense-experiences. Those sense-experiences could help settle that second-level question only if they themselves indicated that the evil demon possibility is not in fact realized. But if one's perceiving *whatever* one perceives is compatible with that possibility's being realized (as this view of perception implies), then *no* particular perception could be known or reasonably believed to indicate that the possibility is not realized. Just as there are no sure signs by which an experience can be recognized as a waking experience and not a dream, so there will be no sure signs by which an experience can be recognized as not produced by an evil demon but produced by things' being as the perception represents them as being.

With possible doubts generalized to *all* sense-experience in this way, even the existence of one's own body is cast into doubt, insofar as that body is thought to be known through the senses. A perception of what I take to be my own hand before me, or of what I take to be a rumbling in my stomach, is just as vulnerable to an evil demon's deceptive machinations as perceptions of a mountain or of a piece of paper. So what become epistemically problematic as a result of these possible doubts are not only bodies spatially distinct from me. Even my own body is cast into what in this special (non-spatial) sense is now to be called the "external" world. That is a world "external" to, or "beyond," each perceiver, in the sense that it is something that no one can perceive or know about by sense perception alone. Perceivers are never presented in perception with anything they thereby perceive to be true of an "external" world of bodies, including their own bodies.

Myles Burnyeat points out that this thought makes room for the question whether there is any body at all – anything other than mind or thought. He argues that this

question is something completely new in the history of philosophy; it arises for the first time out of Descartes's reflections on sense perception. An "external" world understood in this way is a world distinct from everything that is true of the "subjective experiences" of perceivers. So by putting "subjective knowledge at the center of epistemology," Descartes "thereby made idealism a possible position for a modern philosopher to take" (Burnyeat 1982:33). No such possibility was even contemplated in the philosophy of antiquity. Nor was Descartes himself drawn in the direction of idealism by these reflections. But his attack on the senses as a source of knowledge of the world eventually made idealism a live philosophical option.

Much of the history of epistemology in the twentieth century was an attempt to show in one way or another how we can and do in fact have knowledge of the world around us. This problem took on its especially obstinate character only because of the view of sense perception that arises from Descartes's reflections. If that view is not accepted, and it is granted that we are capable of perceiving the way things are in the world around us, it would be easy to explain our knowledge of the world. We could know how things are by seeing or otherwise perceiving them to be a certain way. The challenging epistemological problem of the external world was not to be answered so straightforwardly. It was understood as a question about how we get knowledge of the world around us on the basis of sense-experience even though no particular sense-experience can reach as far as any fact of the world we claim knowledge of.

This way of putting it can make it sound as if there can be no satisfactory solution to the problem at all. I think this way of putting it accurately describes the problem as it was understood by those impressive philosophers of the twentieth century who took it most seriously. And I think there *can* be no satisfactory solution to the problem so understood. With only the restricted resources this view of perception allows to be available, I think it cannot be shown how anyone could know or have reason to believe anything about an "external" world on the basis of sense-experience, or indeed anything beyond the character of the perceiver's sense-experience of the moment.

It is sometimes suggested that the trouble lies only in the apparently arbitrary "Cartesian" requirement that the experiences adequate for a satisfactory solution must be restricted to the perceptions of each single, individual perceiver. With the shared experiences of humankind to rely on there is thought to be no difficulty in explaining how we get reason to believe the things we do about the world. But these Cartesian reflections about perception do not begin from an arbitrary insistence on an individualistic solution to the problem of knowledge. The essentially first-person character of the project is itself a by-product of this very view of perception and the conception of the "external" world it leads to.

It is not an arbitrary or unjustified assumption to say that each perceiver perceives only what he or she perceives. It is a simple truth. The question is *what* a perceiver can properly speaking be said to perceive. This view says that everyone perceives only that about which he could not conceivably be mistaken given the perception in question, and that therefore no one can ever perceive that any other perceiver, or indeed any enduring object at all, including his own body, exists. The threat of solipsism is a consequence, not a presupposition, of this view of perception. So the thought of there being other perceivers whose perceptions cohere with and so help support one's own beliefs is a thought about a world "external" to whatever one perceives. It is therefore not

available as contributing to anyone's perceptual justification of his beliefs. It is part of the problem, not the solution.

The reflections that seem to lead to this understanding of perception, and so to the general epistemological problem, can be found above all in Descartes. But that is not to say that Descartes himself was in this apparently hopeless plight, or that he thought anyone else was in it. He was concerned at the first step of his method to expose the pretensions of the senses as a source, or perhaps the only source, of knowledge of the world. Having done so, he looked elsewhere for something invulnerable to all possible doubt, and so "completely certain and indubitable." His strategy was to try then to extend the scope of whatever certainty he could find at first by further reflection at each point on what must be so if he has been able to reach the certainty he has achieved so far.

The starting point and foundation of the whole project is the discovery of something Descartes saw must be true even if he was deceived as much as a powerful demon could possibly deceive him. No such demon could bring it about that he is nothing while he thinks he is something. To be deceived is to think something that is not so, but he could not be deceived in thinking that he exists. No one who thinks could think falsely that he exists. Descartes sees that "this proposition, *I am, I exist*, is necessarily true whenever it is put forward by me or conceived in my mind" (2:17; AT 7:25). This is certainly among the most important and longest-lasting ingredients of Descartes's legacy, and it has borne rich and, in combination with other Cartesian ideas, sometimes apparently unpalatable, fruit. The full significance of the fundamental insight can be seen to extend in several directions, not all of which even now have been exhaustively explored.

There is first a question of the precise character and distinctive status of propositions like "I think" and "I exist." There is a further question of how large and varied the class of propositions with that distinctive character can be seen to be. And there is a question about the source and nature of the certainty that discovering truths with that special status can provide, and how far the range of that certainty can be found to extend. These questions are obviously all connected. They are central to Descartes's philosophical enterprise and, as things turned out, to modern philosophy at large.

A thinker obviously could never be wrong in thinking "I think." That is something that must be true if he thinks anything at all, even if he thinks "I am not thinking." The same is true of "I exist"; it cannot possibly be truly denied. Descartes finds it "self-evident" that it is "impossible" for someone to think without existing (2:100; AT 7:140). He "see[s] very clearly that in order to think it is necessary to exist" (1:127; AT 6:33). So the truth of a thinker's thought "I exist" is a necessary condition of the thinker's thinking anything. The same holds for all other necessary conditions of that thinker's thinking. Everything that must be true if a thinker thinks is something that could never be false if thought by that thinker.

Many propositions are not truly deniable because they are necessarily true. They could not be false under any circumstances, so they could not possibly be false if thought by any thinker. Their truth is in that sense a necessary condition of any thinking. But when Descartes says that "I exist" "is necessarily true whenever it is put forward by me or conceived in my mind," he does not mean that "I exist" is a truth of that kind, or that his thinking guarantees that it is necessarily true in that way. He means only that, necessarily, if he thinks then he exists.

He is in fact René Descartes, who existed from 1596 to 1650. So what he said of himself – and could never possibly truly deny – during that period is something that is no longer true of him. If certain things had been different in certain possible ways, what is true of him now (that he does not exist) would even have been true at a time – say, 1638 – when he actually (and so truly) thought “I exist.” He could have failed to exist in 1638. His existing is therefore a necessary condition of his thinking without itself being something that holds necessarily. It is, in an appropriately absolute sense, something contingent. But it is a necessary condition of his thinking, which itself is also something contingent. That is the distinctive character of propositions such as “I think” and “I exist” that Descartes first draws attention to.

Something’s being a necessary condition of a person’s thinking is not in itself enough to give that person knowledge or certainty of its truth. Although the thinker could not possibly truly deny anything that stands in that relation to his thinking, there might be many things which he does not know or even suspect have that status. If he is unaware that a given proposition falls into that special category for him, he will not recognize that it is a truth he could rely on without any possibility of error in all his further reflections. For a proposition to take on that kind of role for a thinker he must recognize, with certainty, that its truth does stand in that necessary relation to his thinking.

Descartes holds that in his original certainty of his own existence as a thinking thing he finds what is required for his being certain about anything (2:24; AT 7:35). This mark of certainty is then to be invoked at each step in attempts to extend his certainty further. At the first step he recognizes that his “clear and distinct perception” of his own existence is a perception in which he could not possibly be wrong. What he “clearly and distinctly” perceives to be so in that case could not turn out to be mistaken. But that is because no one could fail to exist if he thinks or perceives anything at all. The further reflections Descartes engages in at later stages concern not simply the conditions of his thinking anything at all, but the conditions of his thinking in certain specific ways or having certain determinate thoughts. His goal is to arrive at further conclusions about how things are or must be from the fact that he has the specific thoughts he knows he has.

These further inferences are accordingly more problematic, and have understandably been the focus of most of Descartes’s critics from his own day to ours. There is a recurrent question whether and how the rich conclusions he claims to arrive at can be reached from such beginnings alone. And are the principles invoked in drawing those conclusions known with the same kind and degree of certainty – and is the same mark or criterion of certainty invoked – as that with which a person knows that he could not possibly be wrong in thinking that he exists?

For instance, Descartes examines the contents of his own mind and finds there an idea of an eternal, infinite, omniscient, omnipotent creator. His reflections on how he could possibly have such thoughts lead him from the fact of his thinking them to the eventual conclusion that such a being exists with all those attributes. This being is even said to be the guarantor of the truth of everything that Descartes comes to perceive clearly and distinctly to be true. No such outside help was needed to guarantee the truth of his original thought “I exist.” That was seen to be true simply because it could not be false if he thought it; and seeing that that is so is all he needed to be certain of his existence.

Having found that he cannot doubt that he himself exists and is something that thinks, Descartes also tries to determine by reflection exactly *what* he is. He cannot doubt his own existence, but his attack on the senses shows that he can doubt the existence of all bodies. From his having these two thoughts he appears to conclude that a certain thing is possible: he could exist without a body. The earlier reflections on God appear to play a role here. So he is something essentially non-bodily. The resulting “dualism” of a non-thinking body distinct from a non-bodily “mind” has done much to give the legacy of Descartes a bad name.

It is not surprising that so much critical attention has been directed to almost every step of these complex lines of thought. If we now have any greater understanding and appreciation of the precise source of the difficulties they raise, we remain at least in that indirect way indebted to Descartes. But the difficulty of extending the distinctive status and undeniable certainty of “I think” and “I exist” to other and more substantive propositions does not detract from the fundamental importance of Descartes’s recognition of that distinctive status and of what it promises. Nor is difficulty alone a deterrent to trying to extend it further.

The revolutionary philosophical significance of exploring the necessary conditions of thinking is the idea so richly exploited by Kant. He was interested not simply in his own thoughts or the thoughts of an individual thinker, but in any thinking at all by anyone. And since for him even *experience* of a world is impossible without thought, he focused on the necessary conditions of any possible thought or experience. He saw clearly that all such conditions must have a very special standing in our thought or knowledge of the world. No one could possibly deny any of the propositions that have that standing and be right. Given that there is thought, such things would simply have to be true. For Kant, this was the key to philosophical progress. Metaphysics could be a legitimate intellectual enterprise with secure results only if it restricts itself to the investigation of the general conditions of anyone’s thinking or experiencing anything at all.

For Kant, as for Descartes with “I think” and “I exist,” the interest was not primarily in those propositions that must be true if anyone thinks because they are in an absolute sense necessary and so must be true whatever else is so. Kant regarded propositions of that kind, which cannot be denied without contradiction, as “analytic”; the concept of the predicate of the judgment is already “contained” in the concept of the subject. But Kant sought non-analytic or “synthetic” propositions that express necessary conditions of thought and experience in general. That is because he sought significant metaphysical results about the way the world is or must be. Analytic truths that reveal only which concepts are “contained” in which other concepts would give us only conditional truths about the way things must be *if* they are a certain other way. Kant’s conception of metaphysics was to yield substantive, non-conditional truths about the world.

Kant explored the necessary conditions of thinking certain specific kinds of thoughts, or thinking in certain determinate ways, as Descartes had also done. But Kant did not simply find certain thoughts in his own mind and look for something that must be so in the world if he has them. Having recognized the distinctive undeniability of all necessary conditions of thinking or experience in general, he thought he could prove that there are certain ways of thinking, or certain determinate thoughts, that any thinking

being must have or be capable of. Whatever then could be found to be a condition of someone's thinking in any of the specific ways he identified would also be a necessary condition of thought and experience in general. It would therefore have the same distinctively undeniable status in our thought as Descartes had discovered for "I think" and "I exist."

For Kant, as for Descartes, the significance of there being propositions with that distinctive status was clear; the problem for each of them was to show that the conclusions they most wanted to establish about the world do indeed fall into that privileged class of not-truly-deniable propositions. Kant's strategy was to show that having those concepts or a capacity for making those kinds of judgments that he claimed are necessary for any thought or experience at all necessarily involves having a capacity to think in certain other ways, or to deploy certain other concepts, and so on to further and further conditions. It was to be a demonstration of necessary connections between the possession of certain capacities or concepts and the possession of certain others. It was not simply a question of the necessity with which one concept or set of concepts must be true of something if a certain other concept or set of concepts is true of it. That would yield only analytic truths, and so only conditional necessities. What was needed to yield substantive metaphysical results were the necessary conditions of thinking, and so of thinking certain determinate thoughts about the world, not simply necessary connections between the contents of those thoughts.

Even if Kantian necessities between different ways of thinking could be firmly established by this procedure they would seem to fall short of implying that the judgments shown to be required for the ways of thinking in question are actually true. It is one thing to discover that it is not possible to think at all or to think in certain ways without having certain other determinate thoughts or capacities. It looks like a different and stronger claim to hold (as with "I think" and "I exist") that it is not possible to think such thoughts without their being true. Some explanation would seem to be needed of how the actual truth of the thoughts can be inferred from the fact that they are, or even must be, thought.

Kant in effect denied this apparent gap with his doctrine of transcendental idealism. According to that view, what we have thoughts and experiences about in fulfilling the necessary conditions of thinking and experiencing anything at all is the world in which what we think and experience to be so must in general be true. There can be no completely global gap between how we think and experience things to be and how things are.

This would mean that the apparently hopeless plight that Descartes's attack on the senses seemed to imply for the human perceiver simply could not arise. A single individual might in very bizarre circumstances fall out of virtually all sensory contact with the world for a while, but not for long, and not for a perceiver's whole experiential life. Nor could the human race in general be in such an unfortunate position. So if Kant is right, human beings could not be faced with what came to be seen as the completely general problem of our knowledge of the external world. Having the thoughts and experiences necessary even to seem to face that problem would be enough in itself to guarantee that the world to which one seeks epistemic access is, and in fact must be, experientially available.

This was Kant's conclusion from his reflections on the necessary conditions of any thought or experience. Descartes's own reflections on the conditions of his having the thoughts he finds within himself even after his attack on the senses and its accompanying doubts did not lead him to resolve the apparent epistemic quandary in that way. He was not tempted by, or probably even aware of, the allure of idealism. His hopes for knowledge of the world were to rest ultimately on the good will of a beneficent creator. The Kantian idealist solution invokes no supernatural being, but it is possible to feel that it comes at an equally unacceptable price. Both theories involve discovering by reflection that something that is true of the way things are in the world is a necessary condition of thinkers' thinking or experiencing the things they do. That would yield indubitability equal to that of "I think" or "I exist" if the necessities in question could be demonstrated with that same kind of certainty. A gap appears to arise at what would be the final step in any demonstration of either of these different positive doctrines about the world. That apparent gap is the site of some of the most intense and most productive philosophical reflection of the last 350 years.

The Kantian strategy, for all its idealist extravagance, draws attention to something that Descartes tended to overlook: the conditions of having the thoughts, beliefs, and perceptions essential to possessing any conception of a world at all. That can encourage the more specific question of what must be true of thinkers and perceivers for them even to be vulnerable to the kind of wholesale falsity in their conception of the world that the deceiving demon is imagined to produce. Descartes does not take up this question directly. His reflections on the possible doubts generated by the thought of a deceiving demon lead him to regard the senses as providing only sensations or "images" or "ideas" of "things appearing" to be certain ways. He does not ask what makes it possible for perceivers even to have perceptions with such contents. But he holds that any states of affairs in the world that might be responsible for the presence of such perceptual representations are beyond the reach of perception alone. This is the view that has dominated the understanding of perception since Descartes's day and has generated the problem of the external world.

As Descartes imagines the challenge to the senses, if everything in the world was under the control of a deceiving demon, then anyone who had thoughts and perceptions of just the kinds we all now have in everyday life would have almost entirely false beliefs and, beyond the minimal core of perceptual experience produced by the demon, entirely non-veridical perceptions. It is compatible with that possibility as I myself think of it, for instance, that all that exists in the whole universe is just that deceiving demon and me as I am now. That would certainly render false almost all my current beliefs and perceptions.

But although that would leave me almost completely deceived, is it also true that if all that existed in the universe was a would-be deceiving demon and me, that I would have or could be given just the beliefs and perceptions that I have as things are now? That is harder to accept, whatever we try to imagine the demon doing. Of course, if we imagine, as I suppose we must, that the demon is a supernatural being, he might seem capable of doing anything that can be consistently described. So he might be said to *convince* me that there are mountains and pieces of paper and such things, or to *persuade* me to believe that I see a red tomato on a table, or somehow simply to *give* me such beliefs or perceptions, even though everything I think and believe under those

circumstances is false. But attending to the conditions of thought and perception raises a question about whether and how he could actually succeed in doing that.

It is not enough simply to stipulate that the demon does it. To be convinced or persuaded of something I must at least understand what I thereby come to accept. And for that I would need the requisite concepts or capacities for judgment of certain kinds. And do we know that someone in a world radically different from the world we believe in and take ourselves to perceive *could* even have the concepts and capacities involved in understanding what we all now understand and believe to be so in the world as we take it to be? Again, it might be stipulated that the deceiving demon simply *gives* his victims the requisite concepts or capacities, by magic, as it were. But that is not to explain how he does it, or to show that it is even possible. Can we really make sense of how any agent in the world is able to do such things, or what he could give those thinkers and perceivers that would yield that kind of understanding?

Behind this question lies an issue at the forefront of much recent philosophical discussion. In its most general form it is the question whether or in what ways certain things must be so in the world that thinkers think about and perceive in order for those thinkers even to have the particular thoughts and perceptions they have. Descartes had already found one instance of a positive answer to this general question with his “I think” and “I exist.” He knew that such things had to be true in the world if he even so much as has the thought that they are true. Their falsity would have meant that he did not have those thoughts.

Descartes had at his disposal one way of explaining how the existence or identity of a thought can depend on what is so in the world that is thought about. He asked himself *what* he is, while his attack on the senses was still in effect, and he saw that he could not doubt that he exists although he could doubt that any bodies exist. He saw that it is not by his knowing or believing something about a particular body that he is certain that he exists. Nor could he even be certain at that point that there are such things as spiritual beings or Christian souls in the world, so he is not certain of his own existence by knowing that he is one of those things either. At that stage of his reflections he realized that “none of the things that the imagination enables me to grasp is at all relevant to this knowledge of myself that I possess” (2:19; AT 7:28).

This means that he could withhold judgment about all such worldly matters and still have no doubt that he exists. Even if he freed himself from all beliefs about what is so in the world or what or who he is, he would still have the thought that he exists, and it would be true. His having that thought therefore does not require that he know or believe or think of himself in any particular way. What thought Descartes thinks when he thinks “I exist” depends on the identity of the thinker who has that thought. If some other person were to think “I exist” that would be a different thought; what would be so in the world if that person’s thought were true is not the same as what is so if Descartes’s thought “I think” is true. One of those thoughts could exist without the other. The difference between them is a difference in what is so when they are thought.

In this way Descartes’s application of his method of doubt can be seen to contain the seeds of the idea that his “I” refers unfailingly to him quite independently of how he might happen to think of himself. He does not need to think of himself in some particular way, or have certain beliefs about who or what he is, in order for the reference of

his “I” to get fixed on to the right thing. It is true that he recognizes with no possibility of doubt that he is also a thing that thinks. That is something he cannot avoid believing of himself, but his having that belief is not what guarantees for him the secure reference of his “I.” For one thing, being *a* thing that thinks does not suffice to secure unique reference. And being *the* (unique) thing that thinks is not something he can know to be true of himself in his current state of doubt. So it cannot be used to secure unique reference either. He nonetheless succeeds in referring to himself, and himself alone, in his thought “I exist.”

Other forms of direct indexical reference are present in thoughts of other kinds whose existence and identity depend in similar ways on what is so in the world the thinker in question thinks about. This can be seen to guarantee the distinctive undeniability of certain other parts of what any thinker needs to think in order to have a functioning conception of a world in which he exists. Any agent needs a notion of “here” and “now,” for instance, to place his thoughts about himself and his possible actions at a particular place and time. And what thoughts he expresses in using those words depends not on what he believes about the world at the place and time he has the thoughts, but on where and when he actually is in the surrounding world that contains him.

The same can be true of certain uses of demonstrative terms like “this” and “that” when used to pick out items available in perceptual experience. An object thought of or even perceptually presented in a certain way can be essential to the identity of a particular thought about the world even if the way that object is thought about or perceived is not essential to that very thought about it. In philosophy today we are increasingly familiar with the even broader question of how far something like this indexical or demonstrative aspect of thought can be seen to extend, and whether any cognitive links between thinkers and something they could think about would be possible without it.

These are all further extensions of a line of thinking arguably present in rudimentary form in Descartes’s original insight into his “I exist.” Although he did not pursue its implications in this particular way, it is something that perhaps promises eventually to overcome the almost irresistible idea of a completely global independence of all thought and perception from whatever world there might happen to be that either does or does not match up to those thoughts and perceptions. To get beyond that (Cartesian?) conception altogether would be a formidable advance in human understanding. We are indebted above all to Descartes for his forceful articulation of that fateful idea, and again to Descartes and to anyone else who does anything to explain and help undermine its undeniable appeal.

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